24316

REMEDIAL ACTION REPORT

Cedartown Municipal Landfill Site
Cedartown, Georgia

Prepared for:
Cedartown Municipal Landfill Site Group

FEBRUARY 1998
REF. NO. 3482 (12)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

TABLE OF CONTENTS

<u>LIST OF FIGURES</u>
(Following Report)

LIST OF TABLES
(Following Report)

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 PURPOSE

The former Cedartown Municipal Landfill (CML Site), located on the perimeter of Cedartown, Georgia, is an abandoned iron mine which was used by the City of Cedartown as a municipal landfill from the mid 1950s to mid-May 1980. The majority of the wastes disposed of at the CML Site were municipal solid wastes. Lesser amounts of industrial wastes were also reportedly disposed of at the CML Site.

In the late 1980s, the United States Environmental Protection Agency (USEPA) conducted a preliminary assessment of the CML Site which involved an initial site investigation and an evaluation of the CML Site using the Hazardous Ranking System (HRS). The aggregate HRS score for the CML Site was 33.62, which derived exclusively from groundwater. The CML Site was subsequently proposed for inclusion on the National Priorities List (NPL) in June 1988 and was finalized in March 1989.

The Cedartown Municipal Landfill Site Group (Group) completed a Remedial Investigation (RI) and Feasibility Study (FS) in July 1993 pursuant to USEPA's Administrative Order on Consent (AOC). The results of the RI indicated that potential exposure to Site-related chemicals in surface water, soil and sediments does not result in an unacceptable cancer risk or non cancer hazard. However, the estimated potential cancer risk and non cancer hazard from potential future exposure to groundwater exceeded USEPA's target risk range and a hazard quotient of one. Therefore, USEPA established remedy Performance Standards for those chemicals which exceeded USEPA's target risk range or Safe Drinking Water Act Maximum Contaminant Level (MCL) to ensure that any future groundwater users would not be exposed to unsafe levels of Site-related contaminants.

The Group undertook a Remedial Action (RA) at the CML Site that included cover maintenance and seep control, institutional controls, and groundwater and surface water monitoring. These remedial actions were termed the "Selected Remedy" in the Record of Decision (ROD).

This document presents the Remedial Action Report for the CML Site. The RA Report presents a summary of the remedial actions undertaken as part of the Selected Remedy and provides a certification that the remedial action is complete. The RA Report is submitted to fulfill the requirements of the Unilateral Administrative Order (UAO).

1.2 SITE DESCRIPTION

The CML Site is located in Polk County on the outskirts of the City of Cedartown, Georgia, approximately 62 miles northwest of Atlanta, Georgia. The Site encompasses a former iron ore mine which subsequently was used as a municipal landfill. The CML Site is situated on the western edge of Cedartown and is bordered on the east by Tenth Street, the south by Route 100 (Prior Station Road), and the north and west by undeveloped and/or agricultural land. All portions of the CML Site are now controlled by the City of Cedartown (see Section 2.3.1). The general location of the Site and a Site plan are illustrated on Figures 1.1 and 1.2, respectively.

Property immediately east of the CML Site consists of an industrial complex while land to the north, south and west is a mixture of residential, agricultural and undeveloped land.

The CML Site, which consists of land formerly used as part of the landfill operations, occupies approximately 94 acres. The CML Site itself is well vegetated with wooded areas along the north, south, and west. A seasonal stream and pond, which appear during periods of high precipitation, exist approximately 700 feet west of the western CML Site perimeter. The eastern half of the Site is covered by thick grasses. Approximately 10 acres of land, situated between the eastern and western halves of the CML Site, were not used for landfill operations. This area includes the pond situated directly behind the former Rome Coca-Cola Bottling Company building (referred to herein as the "Coke Pond") and the lands in and around the former Leary residence (formerly situated immediately north of the Coke Pond).

All neighboring residences and industries within the City limits are serviced by municipal water.

The surface of the CML Site is grassed with limited areas of exposed soil mainly occurring northeast of the location of the former Leary home. The crown of the Site is 872 feet above mean sea level (AMSL) and gently slopes on all sides with the exception of portions of the western perimeter which are relatively steep (9 percent slope). Minor areas of surficial erosion were observed in the central, northwest and eastern portions of the CML Site. No exposed refuse was observed in any of the erosion areas noted. A leachate seep was observed on-Site west of the Coke Pond. Conditions observed during the RI and reported therein indicated isolated pockets of waste materials were distributed throughout the Site and were encapsulated within the low-permeability native clays and isolated from surface by a clay soil cover (1 to 12 feet thick).

Although the CML Site is not fenced, access is limited due to the dense vegetation which occurs around the northern, western and southern boundaries. The primary access route from the east directs traffic past the City garage and is restricted by a fence gate which limits vehicle access to the CML Site.

1.3 SITE HISTORY

A comprehensive description of the development of the CML Site, based on a review of the aerial photographs and other pertinent Site information, is provided in the RI Report. A summary of the Site history is presented below.

The CML Site was originally developed in the 1880s as an iron ore strip mine. Mining operations continued at the CML Site, with some interruptions, until the mid 1900s. At that time, portions of the CML Site were leased and/or subsequently acquired by the City of Cedartown for development as a municipal landfill.

Pits resulting from the strip mining operations were utilized by the City of Cedartown and Polk County as disposal areas for municipal and, to a lesser extent, industrial wastes. These pits contained native clay or may have been partially backfilled with clay previously stockpiled from the mining operations prior to placement of waste materials. Once waste was in place, the pits were covered and graded.

This type of operation is significantly different than common landfill operations of the period where wastes were placed in large common fill disposal cells with occasional daily and/or interim cover material. The lack of on-going, irregular settlement of the existing cap may be attributable to the shallow intermittent disposal practices which occurred.

The outer limits of the area used for waste placement within on-Site pits, as determined during the RI, are illustrated on Figure 1.3.

While the landfill received primarily municipal solid sanitary waste during its operation, limited quantities of non-hazardous industrial waste were also reportedly disposed of at the Site. The industrial wastes disposed of at the CML Site were thought to include the following:

i) sludge from an industrial waste water treatment system;
ii) animal fat and vegetable oil skimmings from a separation unit;
iii) liquid dye wastes;
iv) latex paint and paint sludges; and
v) plant trash.

In 1979, in accordance with then applicable State regulations pertaining to the closure of landfills, the Site was covered with a layer of clay soil varying in thickness from 1 to 12 feet. A vegetative cover was then established over the soil layer to prevent erosion. In a letter dated February 10, 1981 addressed to Mr. J.J. Brooks, City Manager, Alan R. Laros of the Department of Natural Resources confirmed, based on his inspection of the CML Site, that the Site closure satisfied then applicable closure requirements. This approval letter also reiterated the need to maintain the Site "with special attention given to erosion control and to the development of adequate vegetative cover", for a minimum of one year.

On June 6, 1985, a representative of USEPA completed an initial site inspection to evaluate conditions at the CML Site and identify areas of potential investigation.

In October 1986, an initial reconnaissance of the CML Site was completed by representatives of NUS Corporation (NUS). Subsequently, during 1987 and 1988, an investigation of the CML Site was conducted by NUS. The results of this investigation are summarized in Section 2.0 of the RI Report.

USEPA evaluated the CML Site, based on data collected by NUS, using the HRS. The aggregate HRS score derived for the CML Site as evaluated by USEPA was 33.62, which was based entirely upon a groundwater route score of 58.16. The groundwater route score was based on the reported presence of four organic compounds in on-Site groundwater, as reported by NUS, and the proximity of the CML Site to the Newala Limestone and Knox Group aquifers. The CML Site was subsequently proposed for inclusion on the NPL in June 1988 and was finalized in March 1989.

The Group completed a RI/FS in July 1993 pursuant to USEPA's AOC. The results of the RI indicated that potential exposure to Site-related chemicals in surface water, soil and sediments do not result in an unacceptable cancer risk or non-cancer hazard. However, the estimated potential cancer risk and non-cancer hazard from future potential exposure to groundwater exceeded USEPA's target risk range and a hazard quotient of one. Therefore, USEPA established remedy Performance Standards for those chemicals which exceeded USEPA's target risk range or Safe Drinking Water Act Maximum Contaminant Level (MCL) to ensure that any future groundwater users would not be exposed to unsafe levels of Site-related contaminants.

Subsequent to the review of the RI/FS, USEPA issued a Record of Decision (ROD) on November 2, 1993. The remedy selected in the ROD was groundwater and surface water monitoring, institutional controls to limit land use, landfill cover maintenance and seep controls, and a pump and treat contingency for groundwater. Groundwater and surface water monitoring was selected due to the likelihood of natural attenuation reducing the concentrations of the contaminants of concern.

On November 4, 1994, USEPA approved the Remedial Design/Remedial Action (RD/RA) Work Plan to implement the Selected Remedy outlined in the ROD. The RD/RA Work Plan presented the necessary tasks to complete the implementation of groundwater and surface water monitoring, provide assessment of the groundwater and surface water quality to the Performance Standards for the contaminants of concern set by USEPA, present the necessary institutional controls required to limit land use, and to develop the contingent remedial action consisting of groundwater extraction, groundwater treatment, and discharge to surface water under a NPDES permit.

1.4 CHEMICALS OF CONCERN

Based on the results of the baseline risk assessment (BRA) presented in the RI Report (CRA, July 1992) the only medium of concern was groundwater. The BRA indicated that there was a potential future unacceptable risk or hazard due to exposure to groundwater. The chemicals of concern identified in the BRA and the ROD were beryllium, cadmium, chromium, lead, and manganese. As is discussed in Section 3.0 of this report the only COC at issue is manganese.

1.5 DESCRIPTION OF THE SELECTED REMEDY

In order to meet the objectives of the RD and RA, USEPA selected a remedy based on the FS. The selected remedy as described in the Declaration of the ROD is as follows:

"DESCRIPTION OF THE SELECTED REMEDY"

This action is the first and final action planned for the Site. This alternative calls for the design and implementation of response measures which will *protect human health and the environment. The action addresses the principal threat at the Site, the contaminant sources in the wastes, as well as the ground water contamination at the Site.*

The major components of the selected remedy include:

- *cover maintenance and seep controls;*

- *institutional controls, such as record and deed notices, zoning and land-use restriction;*

- *ground/surface water monitoring program to insure natural attenuation processes would be effective and that contaminants would not migrate;*

- *a two year review during which EPA would determine whether ground water Performance Standards continue to be appropriate and if natural attenuation processes are effective. EPA shall consider and at EPA's discretion implement an active ground water remediation if ground water Performance Standards continue to be appropriate and natural attenuation processes are not effective,*

- *a contingency remedial action which includes ground water extraction, on-Site treatment, and discharge under National Pollutant Discharge Elimination System (NPDES) to a nearby surface water or POTW; and,*

- *continued ground water monitoring upon attainment of the Performance Standards at sampling intervals to be approved by EPA. The ground water monitoring program would continue until EPA approves a five-year review concluding that the alternative has achieve continued attainment of the Performance Standards and remains protective of human health and the environment."*

1.6 RA REPORT ORGANIZATION

The RA Report is organized as follows:

Section 1.0 Introduction

Section 2.0	Chronology of Events
Section 3.0	Performance Standards
Section 4.0	Construction Activities and Quality Control
Section 5.0	Final Inspection
Section 6.0	Certification
Section 7.0	Operation and Maintenance Plan
Section 8.0	Summary of Project Costs

2.0 CHRONOLOGY OF EVENTS

2.1 RECORD OF DECISION (ROD)

Subsequent to the review of the RI and FS for the CML Site, the USEPA prepared a ROD. The ROD was issued on November 2, 1993 and was signed by Mr. Patrick M. Tobin, Acting Regional Administrator for USEPA Region IV.

An amendment to the ROD was issued on June 4, 1996 in which the manganese Performance Standard for groundwater was changed from 0.175 milligrams per liter (mg/L) to 0.84 mg/L. This amendment reflected the findings of the most recent review (November 1995) by USEPA of the manganese reference dose which determined that the previous standard was overly conservative.

2.2 RD/RA WORK PLAN

In accordance with the requirements of the UAO, an RD/RA Work Plan was originally submitted to the USEPA on July 7, 1994. Based on comments received from the USEPA, the RD/RA Work Plan was revised and resubmitted on October 28, 1994. The RD/RA Work Plan was approved by USEPA on November 4, 1994. The RD/RA Work Plan described the tasks necessary to implement the RA specified in the ROD.

The following sections summarize the activities conducted during the RD and RA to fulfill the objectives of the RD/RA Work Plan.

2.3 SUMMARY OF REMEDIAL DESIGN ACTIVITIES

The tasks undertaken in the RD during the implementation of the Selected Remedy were:

i) the implementation of institutional controls;
ii) the decommissioning of existing monitoring wells that would not be used in the monitoring program;
iii) the installation of an additional background well; and
iv) the modification of monitoring well OW-3.

A summary of these RD tasks completed under the UAO are presented in the following subsections.

2.3.1.1 Institutional Controls

The ROD required the implementation of institutional controls to prohibit the use of groundwater and prevent the future disturbance of landfilled areas. In order to meet the requirements, the City of Cedartown (City) negotiated with landowners adjacent to the landfill to deed portions of their lands to the City.

The City received deeds to properties where landfill activities occurred so as to completely control this area. Deeds are from AmSouth Bank as Trustee for the Leary Estate (the principal area of landfill operations), the Hon Company (adjacent to the Coke Pond) and Tilley properties (where the Coke Pond is actually located). The exact location of the properties being deeded to the City is shown on Figure 2.1. The area involves fill operations at the Site, which was leased by the City from AmSouth Bank and the Leary Estate. Therefore, through the obtaining of these deeds, the City now controls all of the area where landfilling activities occurred and the immediate vicinity around the landfilling operations.

Prior to the acquisition of this additional property, the City modified its existing zoning classifications by Ordinance Number 14, 1996. This Ordinance restricts the use of all of the property which is shown by Figure 2.1. These properties have been rezoned as a "special use (restricted)" within the City of Cedartown. As specified in the City Zoning Ordinance Amendment, the following uses shall be permitted on this property:

- *"The planting of permanent vegetation, ground cover, timber or any other vegetation to prevent erosion, sedimentation or to prevent soil disturbance in the designated district.*

- *The property in this classification has previously been declared to potentially be a threat to human health and the environment; or could be potentially such a threat, based upon either federal regulations, state procedures and/or local decisions of the zoning and planning commission of the City of Cedartown. As such, no improvements which would allow human occupation of the property, no ground water collecting facilities, ponds, lakes; nor any wells (drinking water, commercial use wells, raw water or any other type wells) shall be permitted in this district."*

A certified copy of Ordinance 14, 1996 of the City of Cedartown, creating a special restrictive use classification by zoning ordinance of the Municipality is provided in Appendix A. These actions taken by the City have satisfied the requirements for institutional controls intended in the ROD.

2.3.1.2 Task 2 - Monitoring Well Decommissioning

Not all existing monitoring wells were included in the groundwater monitoring program. In addition, several monitoring wells installed by NUS Corporation straddled the residuum/bedrock interface, and one was drilled into the bedrock through the waste without first isolating the waste. These wells may have acted as potential conduits of contamination to the bedrock aquifer. Therefore, four NUS monitoring wells were decommissioned for the following reasons:

Well No.	***Description***
CL-02-WP	Well screen straddled the residuum/bedrock interface
CL-08-WP	Drilled through the waste
CL-09-WT	Shallow well was not required in monitoring program
CL-11-WP	Unknown lithology

The locations of the monitoring wells decommissioned are illustrated on Figure 2.2, while their construction details are presented in Table 2.1.

Details of the well decommissioning are discussed in Section 4.1 and in the "Pre-Final Construction Report" presented in Appendix B.

2.3.1.3 Task 3 - Background Well Installation

During the RI, two monitoring wells (CL-09-WP and OW-6B) were designated as background wells. The purpose of these background wells was to provide an indication of the soil and groundwater chemistry for similar Site geologic conditions unaffected by landfilling operations. However, there was a variation of chemistry between these two wells during the three sampling events performed during the RI. In order to improve the definition of background water quality, an additional background well (OW-7R) was installed in a location adjacent to the Site and upgradient of the landfill as shown on Figure 2.3.

The background monitoring well installation is discussed in Section 4.2 and in the "Final Construction Report" presented in Appendix C.

2.3.1.4 Task 4 - Monitoring Well OW-3 Modifications

Perimeter monitoring well OW-3 was installed during the RI. The monitoring well was originally constructed with a 6-inch diameter low-carbon steel to a depth of 156 feet; and an open hole to 193 feet below grade.

During the RA groundwater sampling events in April and July 1995, it was noted that it was becoming increasingly difficult to achieve low turbidity (i.e. less that 10 NTUs) during well purging. This fact was attributed to the degradation of the low-carbon steel casing and the presence of iron-reducing bacteria. It was therefore recommended to USEPA that perimeter monitoring well OW-3 be modified by completing the monitoring well with 2-inch diameter stainless steel material. USEPA granted approval for the modification of perimeter monitoring well OW-3 on October 17, 1995.

Monitoring well OW-3 was converted to a 2-inch diameter monitoring well in October 1995. The full details of the conversion were previously provided to USEPA in Progress Report No. 18 dated November 3, 1995. A copy of this correspondence is provided in Appendix D.

2.4 REMEDIAL ACTION ACTIVITIES

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives and public and state comments, the EPA Selected Remedy consisted of a program of institutional controls, groundwater monitoring, and a contingent groundwater treatment remedial action for this Site. The remedial actions performed as part of the Selected Remedy included the following tasks:

i) landfill cover maintenance and seep control activities;
ii) groundwater monitoring and sampling; and
iii) surface water sampling.

The following subsections provide a description of typical activities performed in conjunction with each task.

2.4.1 Landfill Cover Maintenance and Seep Control

The CML Site was closed in 1979. Site inspections performed during the RI indicated that the cover was in good repair, most of the Site was well vegetated and only one leachate seep was found. As a result of the stability of the CML Site, landfill cover maintenance and seep control activities were performed on a semi-annual basis for the duration of the RD/RA program. This task included performing a reconnaissance survey of the entire Site to ensure that conditions did not arise which may have posed a threat to human health or the environment. The semi-annual inspections were performed by the City of Cedartown staff. The primary objectives of this task were:

i) to confirm that the integrity of the landfill cover is maintained such that landfill refuse is not exposed at the ground surface; and

ii) to record and report any uncontrolled leachate seeps discharging to the surface.

To date, landfill cover and seep inspections have been conducted by Mr. David Johnson, City of Cedartown Manager, on the following dates:

- February 10, 1995;
- November 21, 1995;
- March 19, 1996;
- October 11, 1996; and
- June 23, 1997

The landfill cover was found to be in good condition with only sporadic (old in nature) superficial refuse. The condition of the east seep remained unchanged, with no evidence of new uncontrolled discharges of leachate.

The semi-annual inspection logs for each of the above dates were reported in the appropriate monthly progress reports. Copies of the semi-annual inspection logs are provided in Appendix E.

2.4.2 Groundwater Monitoring and Sampling

Groundwater sampling was conducted as part of the Selected Remedy. The Site monitoring well network consisted of perimeter monitoring wells and interior monitoring wells. The purpose of the perimeter well groundwater monitoring program (including upgradient monitoring well locations) was to evaluate the impact of the landfill, if any, on the downgradient water quality. The purpose of the interior well groundwater monitoring program was to verify the effectiveness of natural attenuation of the contaminants of concern. A summary of the monitoring well network completion details are provided in Table 2.2. The locations of the monitoring wells are shown on Figure 2.3.

Groundwater sampling occurred on the following dates:

- Round One: January 4 - 11 and January 23, 1995;
- Round Two: April 24 - May 2, 1995;
- Round Three: July 19 - July 24, 1995;
- Round Four: October 23 - October 26, 1995;
- Round Five: January 2 - January 5, 1996;
- Round Six: April 22 - April 25, 1996;
- Round Seven: July 8 - July 11, 1996;
- Round Eight: October 23 - October 28, 1996;
- Round Nine: February 8 - February 18, 1997; and
- Round Ten: September 9 - September 12, 1997.

All groundwater sampling was conducted in accordance with the methods and procedures presented in Appendix A of the USEPA-approved RD/RA Work Plan. In order to minimize the suspended particulate matter in the groundwater samples, low-flow purging techniques were used. This method was effective in reducing the turbidity of most samples to levels below the objective of 10 NTU.

During each sampling event, the groundwater level in each monitoring well was measured and recorded. During purging, the specified parameters (pH, conductivity, temperature, and turbidity) were measured to verify stabilization had occurred. Groundwater samples were collected directly into laboratory-supplied bottles. The groundwater samples were preserved with nitric acid, stored on ice and shipped by overnight courier to the contract laboratory.

Due to dry conditions, it was not possible to obtain groundwater samples from all three interior monitoring wells during each sampling event. The number of groundwater samples obtained from each interior well during the ten sampling events were:

- CL-05-WP 8 samples
- CL-06-WP 3 samples
- CL-07-WP 2 samples

Each groundwater sample collected was analyzed for the five groundwater contaminants of concern: beryllium, cadmium, chromium, lead, and manganese. Laboratory analyses were conducted by Quanterra Environmental Services, Inc. of North Canton, Ohio.

The ninth sampling event was conducted at the request of USEPA to confirm the results of the eighth round of groundwater sample collection. Confirmation was requested due to the presence of manganese, for the first time, at perimeter monitoring well CL-04-WP. In addition, sample collection round ten was conducted at the request of USEPA to verify the absence of a leachate plume. This sample round was similar to previous rounds with the addition of the analysis for the following leachate indicator parameters:

- chloride, sodium, sulfate, vanadium, and zinc.

The results of the tenth round of sample collection were not used in the statistical evaluation of the Performance Standards.

The full details of the field activities associated with groundwater sampling rounds one through ten were previously provided to USEPA in a series of Technical Memoranda. Copies of these Technical Memoranda are provided in Appendix F.

2.4.3 Site Surface Water Sampling

As part of the Selected Remedy, surface water sampling was conducted to evaluate the impact, if any, of the east seep on the water quality in the Coke Pond. Surface water sampling was conducted in conjunction with the first eight groundwater sample collection activities. The surface water sample was analyzed for parameters indicative of leachate impact from the east seep.

These parameters included aluminum, chromium, copper, lead, nickel, and zinc. Laboratory analyses were conducted by Quanterra Environmental Services, Inc. of North Canton, Ohio. Technical memoranda detailing the field sampling activities for each sample round are presented in Appendix F.

2.4.4 Data Validation

CRA submitted all investigative samples to Quanterra Environmental Services, Inc. of North Canton, Ohio. Each of Quanterra's laboratory reports is presented in Appendix G. Following the receipt of analytical data for each round of RA sampling, a formal assessment of the reported analytical data, from a quality control (QC) perspective, was conducted by CRA. On the basis of these reviews, the investigative data were acceptable for use in a quantitative assessment. Further details of each QC assessment are presented in the data validation memoranda included in Appendix G.

3.0 PERFORMANCE STANDARDS

3.1 GENERAL

The following section of the RA Report presents the plan implemented to ensure that the specified groundwater and surface water Performance Standards were met. Compliance with the Performance Standards was determined by means of groundwater and surface water sampling as described in Section 2.4. The sampling procedures followed are described in the FSP presented in Submittal A1 of Appendix A of the RD/RA Work Plan. The QA/QC protocols used in the Performance Standards verification monitoring are presented in the QAPP (Submittal A2 of Appendix A of the RD/RA Work Plan).

As previously described, the results of the RI indicated that potential future exposure may present an unacceptable excess cancer risk or non-cancer hazards. As a result, USEPA developed groundwater Performance Standards for the chemicals of concern. As discussed, the groundwater Performance Standard of 0.84 mg/L was implemented in June 1996 as a result of the change in reference dose for manganese as described in the amendment to the ROD. Groundwater Performance Standards are presented in Table 3.1; surface water Performance Standards are presented in Table 3.2.

Groundwater sampling was performed and the data evaluated, as described in Section 6.3 of the RD/RA Work Plan, to determine background conditions.

The following subsections present the results of the tasks performed by the Group to demonstrate the validity of and/or compliance with the Performance Standards.

3.2 SITE GROUNDWATER RESULTS

3.2.1 Overview

Groundwater samples were collected from the monitoring well network on a quarterly basis during the RA and on two additional occasions at the request of USEPA. The locations of each of the monitoring wells in the RA monitoring well network are shown on Figure 2.3. Each of the groundwater samples were analyzed for beryllium, cadmium, chromium, lead and manganese.

The first round of RA sampling was conducted in January 1995. Groundwater monitoring has continued on a quarterly basis from that time until October 1996. Two additional groundwater monitoring events were conducted in February 1997 and September 1997 at the request of USEPA. The February 1997 sampling event was conducted due to the detection of manganese, for the first time, at perimeter monitoring well CL-04-WP during the previous sampling event (round eight). The September 1997 sampling event was conducted to confirm that the detected manganese in the perimeter wells was not due to a leachate plume. This was investigated by analyzing groundwater samples for the Site parameters as in previous rounds with the addition of the following leachate indicator parameters requested by USEPA:

- chloride, sodium, sulfate, vanadium, and zinc.

The following subsections of this report present a summary of the analytical results.

3.2.2 Site Background Monitoring Wells

Three Site background monitoring wells are included in the groundwater monitoring network. These monitoring wells include: OW-6B, OW-7R, and CL-09-WP. The locations of the background monitoring wells are shown on Figure 2.3.

Over the ten rounds of RA sampling, the analytical data have remained relatively consistent. Neither beryllium nor cadmium were detected in any of the background monitoring wells in any of the RA sampling events. Manganese has been detected in each of the background monitoring wells, at concentrations ranging from 0.0101 mg/L (in CL-09-WP in January 1996) to 0.491 mg/L (in OW-7R in January 1995). These detections are below the known levels of naturally occurring manganese encountered in the abandoned Ledbetter Mine as discussed in the report entitled "A Preliminary Report on the Part of the Iron Ores of Georgia, Polk, Bartow, and Floyd Counties, Bulletin No. 10-A, Geological Survey of Georgia," (1900) by S. W. McCallie.

Lead was detected in two of the three background monitoring wells. Lead was detected in one round of sampling in OW-7R at 0.011 mg/L in January 1995, but has not been detected in this well since that time. Monitoring well OW-6B has also had detections of lead in three monitoring rounds. The detected concentrations in OW-6B have ranged from 0.0036 mg/L in April 1996 to 0.005 mg/L in April 1995.

Chromium was detected on one occasion in two of the background monitoring wells. Chromium was detected at a concentration of 0.0101 mg/L in OW-7R in January 1995, and chromium was found at 0.0162 mg/L in OW-6B in October 1996. In all other quarterly sampling events, chromium was not detected in any of the background monitoring wells.

A summary of the background monitoring well data is presented in Table 3.3.

3.2.3 Site Interior Monitoring Wells

The three interior monitoring wells included in the groundwater monitoring network are: CL-05-WP, CL-06-WP, and CL-07-WP. The purpose of monitoring these interior wells during the RA was to determine the degree of natural attenuation occurring between the base of the landfill and the perimeter monitoring wells. As stated in the USEPA-approved RD/RA

Work Plan, the data generated from the interior well monitoring program will not be used to determine if further remedial action is required.

Attempts to collect samples from the interior monitoring wells were made during each quarterly sampling event; however, during many sampling events, samples could not be collected from the interior wells due to dry conditions. The available analytical data are discussed in the following paragraphs.

None of the interior monitoring wells contained beryllium or cadmium in any of the RA sampling events.

Manganese was detected in each of the interior monitoring wells during each sampling event. Monitoring well CL-05-WP was sampled eight times during the RA sampling program and had manganese detections ranging from 1.27 mg/L in January 1995 to 2.46 mg/L in April 1995. Monitoring well CL-06-WP was sampled only three times during the RA sampling program and had manganese concentrations ranging from 0.204 mg/L in April 1996 to 0.888 mg/L in April 1995. Monitoring well CL-07-WP was sampled only twice during RA sampling and contained manganese at 0.274 mg/L in April 1996 and at 0.810 mg/L in May 1995.

Lead was also detected in each of the interior wells in at least one RA sampling event. Monitoring well CL-05-WP contained lead at 0.003 mg/L in the sample collected in July 1995. No other samples collected from this well contained detectable levels of lead. Lead was also detected once in monitoring well CL-06-WP at a concentration of 0.0046 mg/L (April 1995). Monitoring well CL-07-WP contained detectable levels of lead in both sampling events. The lead levels in CL-07-WP were 0.0268 mg/L in May 1995 and 0.0113 mg/L in April 1996.

Chromium was detected only in monitoring wells CL-06-WP and CL-07-WP. Chromium was detected in each of the three sampling events at CL-06-WP and ranged from 0.0103 mg/L in April 1996 to 0.423 mg/L in January 1995. Chromium was detected in each of the two rounds of groundwater sampling at CL-07-WP at concentrations of 0.23 mg/L in May 1995 and 0.398 mg/L in April 1996.

A summary of the interior monitoring well analytical data is presented in Table 3.4.

3.2.4 Site Perimeter Monitoring Well

Seven monitoring wells are included in the Site perimeter monitoring well network for the RA sampling. These wells include: OW-1, OW-2, OW-3, OW-4, OW-5, CL-03-WP, and CL-04-WP. The purpose of the perimeter well sampling is to determine the impact, if any, of the landfill on the downgradient chemistry, and the effectiveness of natural attenuation in achieving the groundwater performance standards at the perimeter of the Site.

None of the perimeter monitoring wells contained beryllium, cadmium or lead in any of the RA sampling events.

Chromium was detected only in OW-1 and only in one sampling event during the RA groundwater monitoring program. Chromium was detected at a concentration of 0.0104 mg/L in OW-1 in July 1996.

Manganese was detected on at least one occasion in each of the perimeter monitoring wells. This is consistent with the naturally occurring sporadic and random concentrations of manganese reported in the region of the Site (McCallie, 1900). Both CL-04-WP and OW-5 contained manganese on only one occasion at concentrations of 0.0197 mg/L (October 1996) and 0.0108 mg/L (January 1995), respectively. However, manganese has been consistently detected in monitoring wells OW-1, OW-2, OW-3, and OW-4. Manganese concentrations have ranged from 0.0164 mg/L (July 1996) to 4.33 mg/L (February 1997) in OW-1; from 0.191 mg/L (February 1997) to 1.22 mg/L (September 1997) in OW-2; from 0.114 mg/L (January 1995) to 5.3 mg/L (July 1996) in OW-3; from 1.93 mg/L (October 1996) to 7.66 mg/L (February 1997) in OW-4; and from non-detect to 0.0766 mg/L (September 1997) in CL-03-WP.

A summary of the perimeter well groundwater data is presented in Table 3.5.

The distribution of the manganese detections as determined through the use of the first eight rounds of analytical data is erratic, as is illustrated on Figure 3.1. The consistent detections are found in perimeter monitoring wells OW-1, OW-2, OW-3, and OW-4. The perimeter monitoring well manganese concentrations are generally higher than the manganese concentrations detected in the interior monitoring wells. Because manganese concentrations are generally higher in the perimeter wells than in the interior wells, and the consistent detection is limited to four perimeter monitoring wells located on three sides of the landfill area; it is therefore reasonable to conclude that the elevated levels of manganese are due to naturally occurring levels of manganese in the groundwater.

3.3 SITE SURFACE WATER RESULTS

The purpose of the surface water sampling program was to evaluate the impact, if any, of the east seep on the water quality in the Coke Pond. During the RA, the surface water in the Coke Pond was sampled on a quarterly basis for aluminum, chromium, copper, lead, nickel, and zinc. The surface water parameter list was based on detected metals in the ponded seep area during the RI. The ponded seep area potentially flows into the Coke Pond. The findings of the Coke Pond surface water sampling events are discussed in the following paragraphs.

Zinc was detected in the surface water samples collected from the Coke Pond in four out of the eight RA sampling events. The detected zinc concentrations ranged from 0.0221 mg/L in October 1996 to 0.085 mg/L in July 1995. Copper was detected in two of the eight sampling events at a concentration of 0.018 mg/L in both January 1995 and July 1995. Aluminum and lead were detected only in July 1995 at concentrations of 1.87 mg/L and 0.0222 mg/L, respectively.

A summary of the surface water analytical data is presented in Table 3.6.

3.4 SITE GROUNDWATER STATISTICAL EVALUATION

3.4.1 Overview

One of the requirements of the RD/RA Work Plan was the submission of a Two-Year Evaluation Report to USEPA. The Two-Year Evaluation Report, submitted to USEPA on December 19, 1996, discussed the results of a comprehensive statistical analysis using the first eight rounds of analytical data obtained during the RA sampling events. The purpose of the Two-Year Evaluation Report was to determine the appropriateness of the groundwater Performance Standards for the Site and if natural attenuation processes were effective.

The results of the statistical analysis provided in the Two-Year Evaluation Report determined that the Performance Standards for the COCs were valid for they were less than the background concentrations. The evaluation also indicated that all COCs except manganese were below their respective Performance Standards and that natural attenuation was effective.

The statistical analyses were conducted in accordance with all the procedures described in the RD/RA Work Plan. However, these procedures do not consider the random, naturally occurring distribution of manganese at the Site. As a result, the meaningfulness of the statistical analysis is questionable.

Since manganese was the only COC present in Site groundwater at concentrations significantly greater than the Performance Standard, manganese was the main COC considered. In the case of manganese, exceedences of the Performance Standards occurred in three of the perimeter monitoring wells (OW-1, OW-3, and OW-4), but it was determined that this was due to naturally occurring manganese.

The following sections discuss the distribution of manganese in groundwater at the Site using the first nine rounds of analytical data and provide an evaluation of manganese presence with respect to the landfill. It should be noted that no significant statistical difference was observed between the analysis of eight rounds of analytical data versus nine rounds of analytical data.

3.4.2 Evaluation of Perimeter Water Quality vs. Interior Water Quality

A statistical analysis was performed using the first nine rounds of analytical data obtained during the RA sampling events. The purpose of this evaluation was to determine whether there was a statistically significant increase or decrease in COC concentrations downgradient of the Site due to the presence of the landfill. The water quality in each perimeter monitoring well was compared to that of the interior monitoring wells for manganese and chromium, using the confidence interval approach described in Section 6.2.1 of the Two-Year Evaluation Report. No comparisons were performed for the other COCs since beryllium, cadmium, and lead were not detected in any of the perimeter wells.

A summary of calculated statistical results is presented in Table 3.7.

The mean manganese concentration in perimeter monitoring well OW-2 was determined to be not significantly different from the pooled mean manganese concentration in the interior monitoring wells.

However, in perimeter monitoring wells OW-1, OW-3 and OW-4, the mean manganese concentrations over nine rounds of RA sampling were each determined to be statistically significantly higher than the pooled mean manganese concentration in the interior monitoring wells.

The interior monitoring wells provide data which are representative of the groundwater directly impacted by the landfill. In this case, the pooled mean manganese concentration directly below the landfill was

1.218 mg/L. However, further downgradient, the manganese concentrations are significantly greater than the concentrations in groundwater below the landfill. Therefore, the presence of the landfill cannot be the sole source of the elevated levels of manganese in perimeter monitoring wells OW-1, OW-3, and OW-4. An alternate source of manganese has been documented through independent research and is discussed in Section 3.4.3

The mean chromium concentration for each of the perimeter wells over nine rounds of RA sampling was determined to be lower than the pooled interior well mean chromium concentration. This change was not significantly different, but does indicate that contaminants are not migrating from the landfill.

3.4.3 Natural Regional Distribution Of Manganese

A recent review entitled "Naturally Occurring Manganese, Cedartown Municipal Landfill Site, Cedartown, Georgia," (October, 1996) by Superior Consultants and Wm. C. Hutton Consultants established that the region surrounding the Site has naturally-occurring elevated manganese levels in soil, surface water, sediment and groundwater. According to USEPA's "STORET" database, manganese levels as high as 46,200 parts per million (ppm) have been detected in stream sediments about 26 miles northeast of Cedartown. The United States Geological Survey (USGS) database "WATSTORE" documents manganese concentrations ranging from 500 to 57,000 parts per billion (ppb) in Georgia surface water, while levels ranging from 500 to 10,000 ppb have been reported in Georgia groundwater[1]. Substantial manganese deposits have been identified within 5 to 6 miles of the Site, in Polk County. Manganese mining occurred at several locations within 30 miles of Cedartown, and an ore sample collected from the Ledbetter Mine was found to contain manganese at 11,500 ppm. Also, groundwater manganese levels throughout the State of Georgia are higher than those detected at the Site.

Prior to being used as a landfill, the Site was an iron ore mine (the Ledbetter Mine). The relationship between iron ore and manganese has been documented both globally and with respect to Georgia iron ore deposits. Manganese is one of the most common of the impurities associated with brown iron ore. Such iron ores, for example, the Clinton iron ores, are commonly found in the Northwest of Georgia. Manganese ores, as well as brown iron ores, are reported to occur as pockets or irregular deposits. Manganese ore deposits in the nearby Cartersville and Cave Springs districts occur as irregular, lenticular bodies which vary in size, ranging from small grains to large masses. Chemical analyses of manganese ore samples from these districts have indicated manganese levels in the range of 15 percent to 60 percent.

Therefore, the elevated levels of manganese in groundwater are most likely due to naturally occurring manganese in the area of the Site. The presence of randomly distributed naturally occurring manganese at the Site does make the use of the groundwater Performance Standard of 0.84 mg/L at this Site questionable.

3.4.4 Transport

If it is assumed that the migration of leachate from the landfill is occurring, leachate migration from the landfill to the downgradient wells would occur via the limestone stratum underlying the waste and clay residuum. Therefore, it is relevant to assess the COC concentrations in the leachate as it leaves the landfill proper and migrates to the underlying Bedrock Aquifer, which is the conduit for leachate migration to the downgradient monitoring wells.

As the leachate migrates from the landfill to the underlying bedrock aquifer, and then downgradient, processes such as advection, dispersion, dilution, and sorption take place and would result in the reduction of leachate concentrations in groundwater. Solute concentrations along the groundwater flowpath would ultimately be reduced. Even conservative tracers (i.e., compounds that do not interact with porous media or undergo decay), exhibit reduced concentrations along a given groundwater flowpath.

If it is further assumed that migration of leachate from the landfill is occurring and is impacting the downgradient monitoring wells, it would be expected to find some contaminants in the downgradient monitoring wells at concentrations significantly less than those observed where the leachate exits the landfill and enters the aquifer. This decreasing concentration trend was observed with chromium at all the downgradient monitoring wells. However, at three downgradient monitoring wells (OW-1, OW-3, OW-4) increased manganese concentrations were observed and at another downgradient monitoring well (OW-2) no significant reductions in concentration were observed.

There is no explanation for the observed increased manganese concentrations downgradient of the Site other than the presence of another source of manganese. The literature and history of the area support the assertion that this elevated manganese is naturally occurring in the soil and groundwater; therefore, further remedial action at the Site would not result in a reduction of manganese concentrations in groundwater downgradient of the Site. The sporadic nature of elevated manganese is also consistent with the established geology of the area, in which manganese deposits are known to occur as irregular lenticular bodies of varying size.

3.5 SURFACE WATER

In order to evaluate the Performance Standards for Site surface water, the surface water analyses obtained during the RA were compared to the appropriate Federal Ambient Water Quality Criteria or more stringent Georgia Surface Water Quality Standard. The surface water quality Performance Standards are listed in Table 3.2.

3.6 SUMMARY OF MANGANESE PRESENCE

The elevated manganese concentrations observed downgradient of the Site are considered to be naturally occurring in the soil and groundwater of the area. The data obtained during the RA sampling support the assertion that the observed elevated manganese concentrations are naturally occurring. Assuming that leachate is migrating from the landfill to the perimeter monitoring wells, the increased manganese concentrations downgradient can only be attributed to another source of manganese. The tenth round of groundwater sampling at the Site was specifically targeted to identify the presence of a landfill-derived leachate plume. This sampling event clearly demonstrated that landfill leachate has not impacted perimeter monitoring wells OW-1, OW-3, and OW-4. As a result, it was positively shown that the manganese in the groundwater is due to another source. Based on the well documented naturally-occurring manganese deposits in the region, and naturally high manganese concentrations in surface water and groundwater throughout the State, it is concluded that these elevated manganese concentrations are naturally occurring.

The sporadic nature of the elevated manganese concentrations in the groundwater is consistent with the documented sporadic nature of manganese and brown iron ore deposits in the region. These deposits typically occur as lenticular bodies of irregular size and distribution.

Due to the naturally occurring high manganese concentrations in the region's soil and waters, remedial action at the Site would not result in a reduction of manganese concentrations in the area downgradient of the Site. Therefore, all Performance Standards have been achieved and the Site Remedial Action is considered complete.

4.0 CONSTRUCTION ACTIVITIES AND QUALITY CONTROL

Construction activities conducted as part of the Selected Remedy included the following:

- abandonment of select NUS constructed monitoring wells;
- background monitoring well construction; and
- modifying existing monitoring well OW-3.

The following sections present the details of the construction activities performed during the RD.

4.1 MONITORING WELL ABANDONMENT

Several of the groundwater monitoring wells installed during the USEPA site investigation were not included in the RA groundwater monitoring program. As a result, it was agreed to decommission these monitoring wells during the RD. The following monitoring wells were decommissioned during the RD:

Monitoring Well No.	*Rationale*
CL-02-WP	Well screen straddled residuum/ bedrock interface
CL-08-WP	Drilled through waste
CL-09-WT	Shallow monitoring well, not required in monitoring program
CL-11-WP	Unknown lithology

The locations of the monitoring wells decommissioned during the RD are presented on Figure 2.2.

Prior to initiating the field activities for this task, detailed decommissioning procedures were developed for each monitoring well. These decommissioning procedures were previously provided to USEPA in the Pre-Final Construction Report. (A copy of this report is provided in

Appendix B). In general, monitoring well decommissioning included the following tasks:

- removing the surface protection;
- checking the riser pipe for plumbness and alignment;
- overdrilling the well with 4 1/4-inch ID hollow-stem augers or a 4-inch ID core barrel;
- removing all the 2-inch diameter well materials;
- backfilling the borehole with bentonite grout; and
- restoring the ground surface.

These procedures were followed for monitoring wells CL-02-WP, CL-09-WT and CL-11-WP. The full details of the decommissioning activities are provided in the Pre-Final Construction Report. Attempts were made to decommission monitoring well CL-08-WP using these procedures; however, a blockage was discovered at 3 feet below grade, which prevented the overcoring. As a result, the 2-inch diameter well screen and riser pipe were filled with bentonite grout. The details of the decommissioning of monitoring well CL-08-WP are also provided in Appendix B.

Subsequent to the decommissioning of monitoring well CL-08-WP, CRA reviewed the original construction documents for the well. Based on this review, it was determined that the closure was adequate. The details of this review and assessment are also provided in Appendix B.

4.2 BACKGROUND MONITORING WELL CONSTRUCTION

During the RI, two monitoring wells (CL-09-WP and OW-6B) were designated as background monitoring wells. The purpose of these background monitoring wells was to provide an indication of the soil and groundwater chemistry for similar Site geologic conditions unaffected by landfilling operations. However, there was a variation in the groundwater chemistry between these two monitoring wells during the three RI sampling events. In order to improve the definition of background groundwater quality, an additional background monitoring well was installed upgradient of the landfill as part of the Selected Remedy.

On December 21, 1994, bedrock monitoring well OW-7 was constructed as an open borehole. Upon initiation of development on January 4, 1995, the monitoring well was found to have collapsed and be non-yielding; therefore, replacement monitoring well OW-7R was constructed on January 19, 1995. Details of the construction are discussed in the "Final Construction Report" presented in Appendix C.

4.3 MONITORING WELL OW-3 MODIFICATIONS

Perimeter monitoring well OW-3 was installed during the RI. The monitoring well was originally constructed with a 6-inch diameter low-carbon steel to a depth of 156 feet; and an open hole to 193 feet below grade.

During the RA groundwater sampling events in April and July 1995, it was noted that it was becoming increasingly difficult to achieve low turbidity (i.e. less that 10 NTUs) during well purging. This fact was attributed to the degradation of the low-carbon steel casing and the presence of iron-reducing bacteria. It was therefore recommended to USEPA that perimeter monitoring well OW-3 be modified by completing the monitoring well with 2-inch diameter stainless steel material. USEPA granted approval for the modification of perimeter monitoring well OW-3 on October 17, 1995.

Monitoring well OW-3 was converted to a 2-inch diameter monitoring well in October 1995. The full details of the conversion were previously provided to USEPA in Progress Report No. 18 dated November 3, 1995. A copy of this correspondence is provided in Appendix D.

4.4 CONSTRUCTION QUALITY CONTROL

Construction activities were conducted in accordance with the RD/RA Work Plan and were observed by USEPA. No significant deviations to the RD/RA Work Plan were made. In addition, consultation was made and approval was granted by USEPA prior to any deviations in field methods.

5.0 FINAL INSPECTION

Due to the limited construction activities performed at the Site during the RD/RA, USEPA did not deem it necessary to conduct a final inspection. USEPA, however, did oversee some background monitoring well construction activities and several groundwater sample collection activities.

6.0 CERTIFICATION

The certification of the Selected Remedy for the Site is discussed in the section that follows. This section of the report summarizes the remedial actions undertaken to date by the Group at the Site. The purpose of this section is to provide a certification that the remedial actions undertaken at the Site are complete and have addressed the potential risk at the Site; and that no further response actions are appropriate. Based on the completion of these actions, the deletion of the Site from the NPL is warranted.

6.1 INSTITUTIONAL CONTROLS

During the RI, it was determined that the only medium of concern was groundwater. This was based on a calculated potential risk to human health based on the consumption of groundwater. At the time of the RI, there were no groundwater users in the vicinity of the Site. This fact holds true today. In order to guarantee that there will be no future use of groundwater in the vicinity of the Site, the City has acquired the lands illustrated on Figure 2.1. An ordinance has been passed by the City establishing these lands as "special use (restricted)". This designation prevents subsurface disturbances and use of groundwater.

This action has eliminated the potential exposure pathway of groundwater consumption.

6.2 LANDFILL COVER AND SEEP MONITORING

As part of the RA, landfill cover inspections have been undertaken on a semi-annual basis. These inspections have confirmed that the landfill cover is in good repair and is well vegetated. It was also noted that the condition of the cover has not changed over the period of the inspections. This fact is not surprising, given that the landfill closed in 1979; and that waste was placed in discrete excavations. Therefore, significant additional settlement is not expected. As a result, no further cover upgrades are required.

During the RI only one leachate seep (east seep) was identified. Leachate seep inspections conducted concurrently with the cover inspections have confirmed that no new seeps have developed. Given this fact, and the lack of impact of the east seep on surface water quality, no further response actions for leachate control are warranted.

6.3 SITE SURFACE WATER MONITORING

The surface water quality monitoring conducted has shown that the east seep has not impacted the water quality of the Coke Pond. The analyses have shown that the concentrations of the surface water COCs meet the most stringent Performance Standards for the Site. As a result, further surface water monitoring is not required.

6.4 SITE GROUNDWATER MONITORING

The Site groundwater monitoring data collected during the RA has shown that the only groundwater COC detected consistently in the background and perimeter monitoring wells is manganese. The distribution of manganese in the groundwater was found to be random in nature. The concentration of manganese was found to be higher in three perimeter monitoring wells than in the interior monitoring wells. In addition, the results of the tenth groundwater sampling event confirmed that the perimeter wells are not impacted by landfill leachate. These facts confirm that the landfill is not the source of manganese in these perimeter monitoring wells.

Independent research has established that manganese is naturally occurring in the soil, surface water, sediment, and groundwater surrounding the Site. The sporadic nature of the elevated manganese detections in Site groundwater is consistent with the documented sporadic occurrence of manganese and brown iron ore deposits in the former Ledbetter Mine.

Due to the naturally occurring manganese in the soil and groundwater, no further response actions will reduce the manganese concentrations in Site groundwater to the Performance Standard specified in the ROD. In addition, the performance of further groundwater quality monitoring will not provide any valuable information with respect to Site conditions.

6.5 SUMMARY

The Cedartown Group has performed all appropriate response actions at the Site. No further response actions will reduce the concentration of manganese in the groundwater to the Performance Standard as the manganese is naturally occurring.

As a result of these findings, it is appropriate for USEPA to delete the Site from the NPL and transfer responsibility for the Site to the State of Georgia.

7.0 OPERATION AND MAINTENANCE PLAN

The operation and maintenance (O&M) program, as presented herein, was developed for the ongoing Selected Remedy components. The following section describes the ongoing (O&M) activities, potential problems associated with these activities and the corrective actions required to avoid or mitigate them.

7.1 LANDFILL COVER MAINTENANCE AND SEEP CONTROL

The integrity of the landfill cover and the presence/absence of uncontrolled leachate seeps shall be confirmed during the semi-annual Site reconnaissance surveys. Landfill cover deficiencies due to slope failure and/or erosion will be mitigated by regrading and/or repacking the cover area to remove the potential for refuse exposure at the ground surface. The landfill cover shall be restored such that a minimum cover of 3 feet is maintained in the problem areas.

If a surface seep is discovered, the discharging fluid will be sampled and analyzed for the surface water contaminants of concern. Once it has been established that the leachate seep poses a potential threat to human health and/or the environment, the appropriate remedial alternative will be determined. Leachate seeps which may adversely impact human health or the environment will be mitigated by one of the following alternatives:

i) repacking and/or regrading the landfill cover at the seeps location; or
ii) installing a toe-drain to transport the leachate to a collection system.

The selection of the appropriate remedial alternative will be based on the location of the seep, the chemistry of the leaching fluid and the potential impacts to human health and the environment. The selected leachate seep mitigative alternative, as determined by CRA and approved by the EPA, will be described in detail in a technical memorandum to be submitted to the Group two weeks after the seep is located.

The long-term frequency of inspections will be determined by USEPA or with GAEPD upon removal of the Site from the NPL.

7.2 GROUNDWATER MONITORING AND SAMPLING

The O&M activities associated with groundwater monitoring and sampling shall include the temporary abandonment of all Site monitoring wells in accordance with Georgia Statute Title 12, Article 3, Chapter 5 (Wells and Drinking Water). In addition, prior to future groundwater sampling activities, the monitoring wells will be inspected by a Georgia registered Professional Engineer or Professional Geologist to determine if corrective action of any monitoring well is required.

Additional activities associated with future groundwater sampling shall include cleaning and calibration of the monitoring, purging and sampling equipment (e.g., water tape, pumps, meters, etc.). The SOPs for cleaning and calibrating the field equipment is described in Appendix A - Sampling and Analysis Plan of the RD/RA Work Plan.

The need for additional groundwater sampling will be determined by USEPA or with GAEPD upon removal of the Site from the NPL.

8.0 SUMMARY OF PROJECT COSTS

8.1 PRP PROJECT COSTS

A cost analysis was developed to estimate the costs to be incurred during the performance of the RD/RA activities. This analysis was presented in the FS and provided a cost estimate for the following RD/RA tasks:

- Background monitoring well installation ($10,000);
- Quarterly groundwater monitoring events and reporting for 0 to 5 years ($232,400);
- Semi-annual groundwater monitoring events for 6 to 30 years ($189,300);
- Annual reporting for 6 to 30 years ($94,430);
- Landfill cap inspections/reporting/maintenance for 0 to 30 years ($88,720); and
- Institutional controls ($10,000).

The total estimated cost to conduct these activities was $625,000 assuming net present worth calculated using a seven percent compound interest factor. This estimate, however, did not include the costs incurred during the performance of the following additional tasks required by the final approved RA, for the petition to delete the Site from the NPL, or those tasks requested by USEPA:

Additional Tasks Required

- Monitoring well decommissioning ($15,000);
- Surface water monitoring ($1,500);
- Two-Year Evaluation Report ($18,000);
- Various additional meetings with USEPA ($3,000).

Petition for Deletion Activities

- Modification of monitoring well OW-3 ($10,000);
- Research of manganese presence, compilation and comparison of groundwater and leachate pH ($15,000);

- Petition to reclassify monitoring well OW-1 as a background monitoring well ($8,000);
- Petitioning to delist the Site from the NPL ($8,000);

USEPA Requested Tasks

- Pre-Final Construction Report ($2,500);
- Final Construction Report ($1,500); and
- Two additional groundwater monitoring events ($18,000);

The total cost for these unscheduled activities amounted to approximately $100,500. Since the inception of the RD/RA activities (May 1994) through to December 31, 1997 total costs for all scheduled and unscheduled activities amounted to $283,867.33. The estimated final cost including all activities performed through the delisting process is approximately $288,000.

8.2 USEPA OVERSIGHT COSTS

The estimated USEPA oversight costs for the initiation of the RA (May 1994) as determined through historic invoicing and projected costs to complete this delisting process is approximately $300,000.

REFERENCES

Dragun, J. (1988), The Soil Chemistry of Hazardous Materials, The Hazardous Materials Control Research Institute, Silver Spring, Maryland.

McBean, E.A., Kompter, M. and Rovers, F. (1988), A Critical Examination of Approximations Implicit in Cochran's Procedure, Groundwater Monitoring Review (GWMR), Winter.

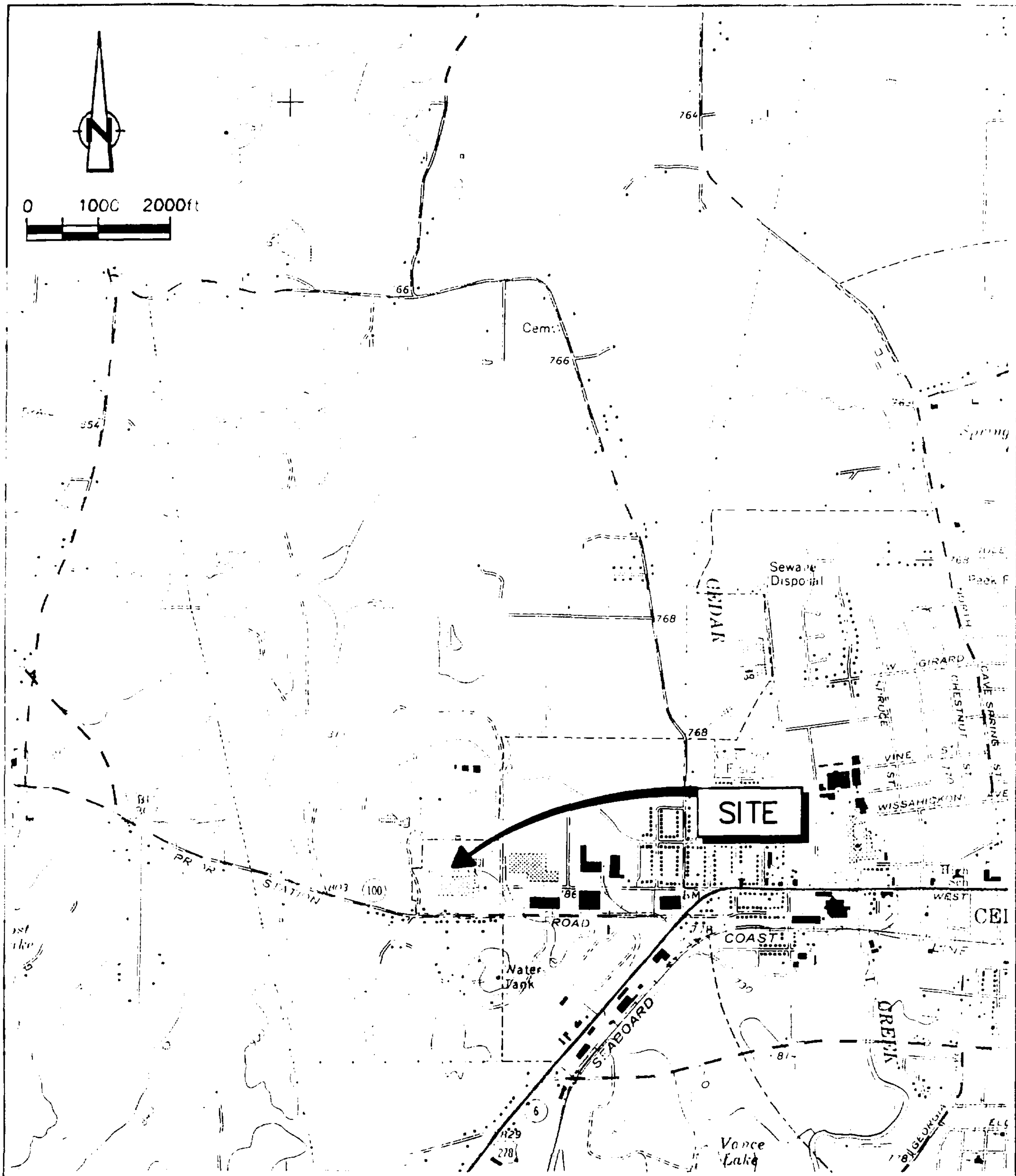
McCallie, S.W. (1900). A Preliminary Report on the Part of the Iron Ores of Georgia, Polk, Bartow and Floyd Counties, Bulletin No. 10-A, Geological Survey of Georgia.

Superior Consultants and Wm. C. Hutton Consultants (1996), Naturally Occurring Manganese, Cedartown Municipal Landfill Site, Cedartown, Georgia, October.

U.S. EPA (1989), Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities. Interim Final Guidance, Office of Solid Waste, Waste Management Division, April.

U.S. EPA (1992), Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities. Addendum to Interim Final Guidance, Office of Solid Waste, Permits and State Programs Division, July, 84p.

FIGURES



SOURCE: USGS QUADRANGLE;
CEDARTOWN WEST, GA.

figure 1.1

SITE LOCATION MAP
CEDARTOWN MUNICIPAL LANDFILL
Cedartown, Georgia

CRA

3482 (12) DEC 02/97(A) REV.0 (M-01)

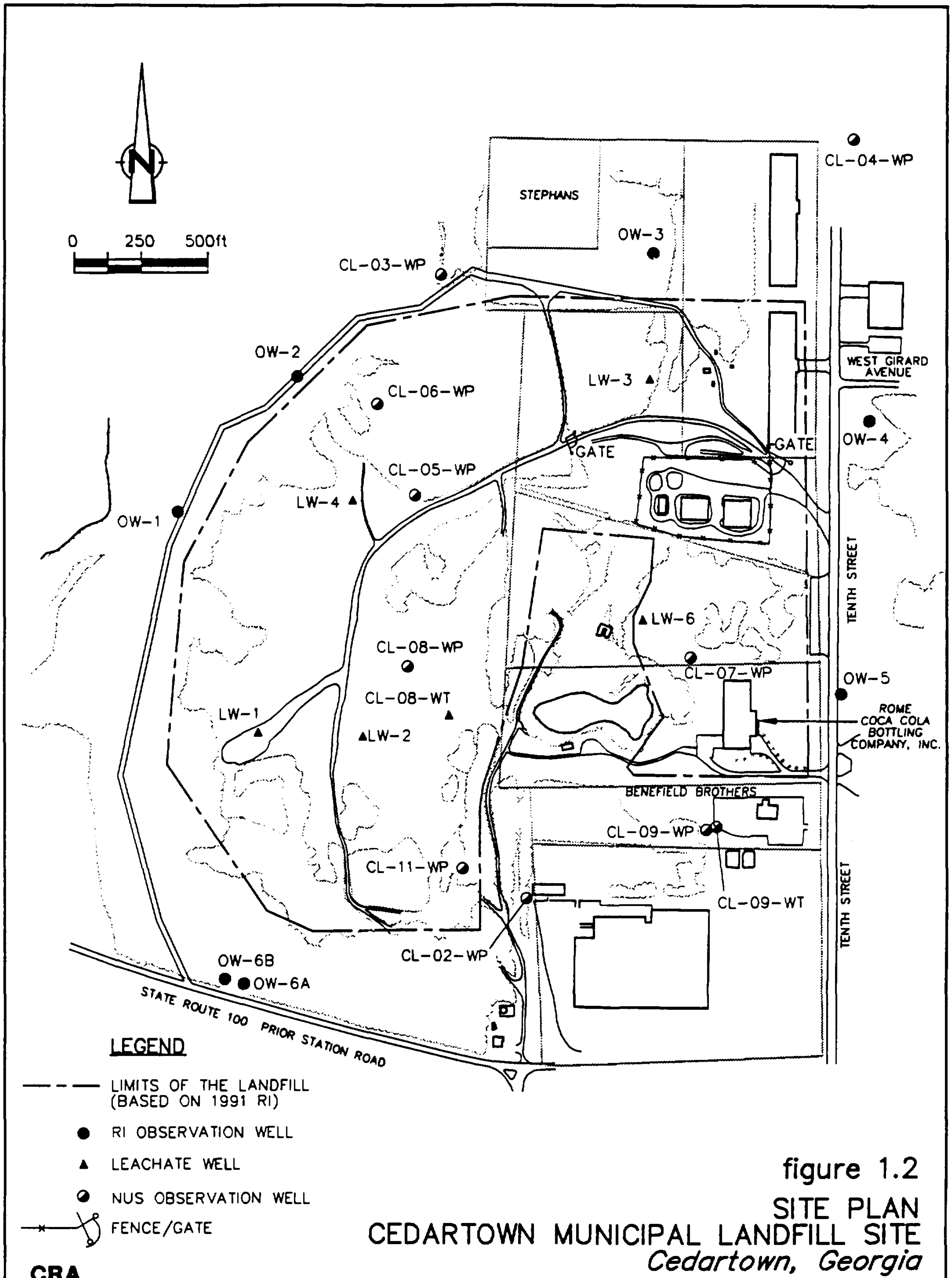


figure 1.2

SITE PLAN
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

3482 (12) DEC 01/97(A) REV.0 (P-15)

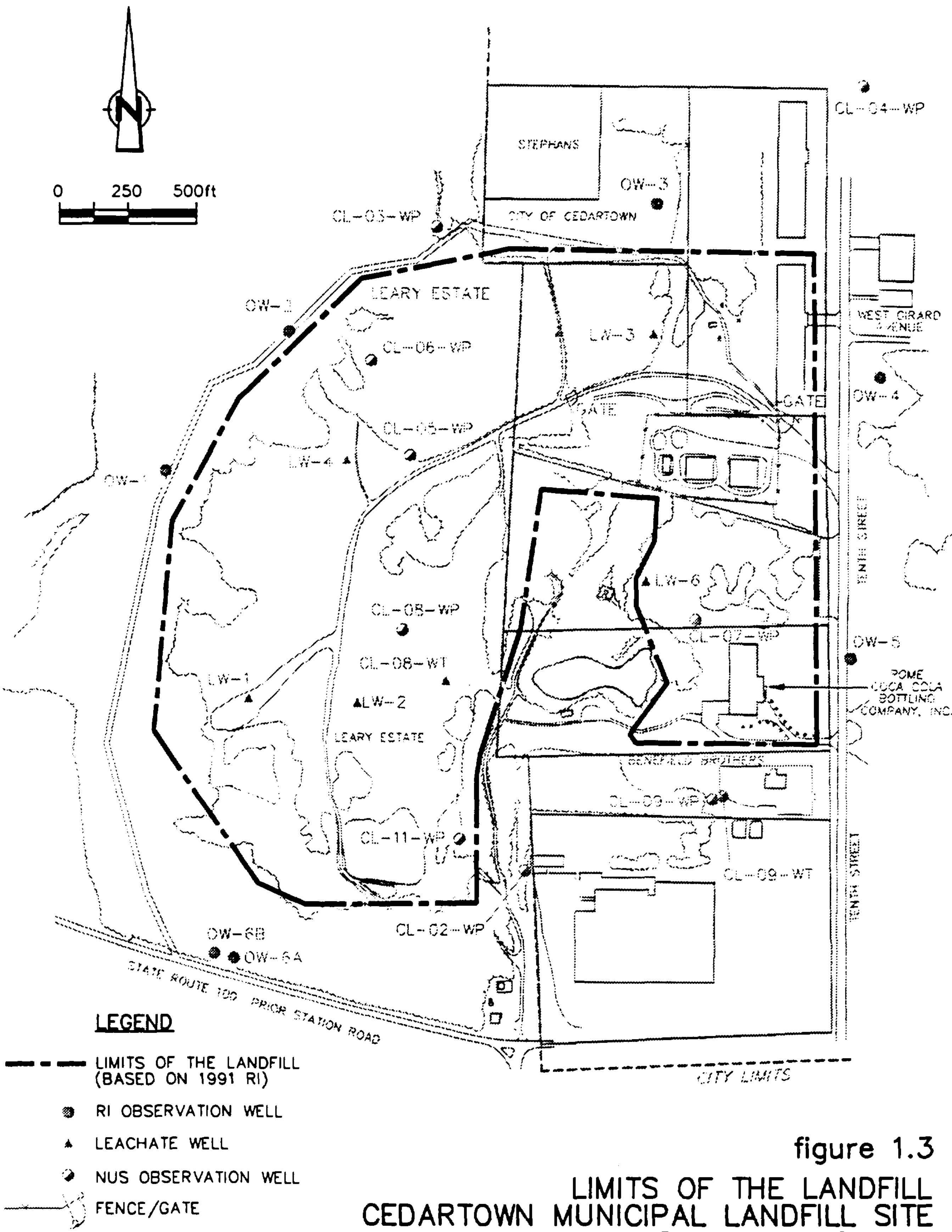
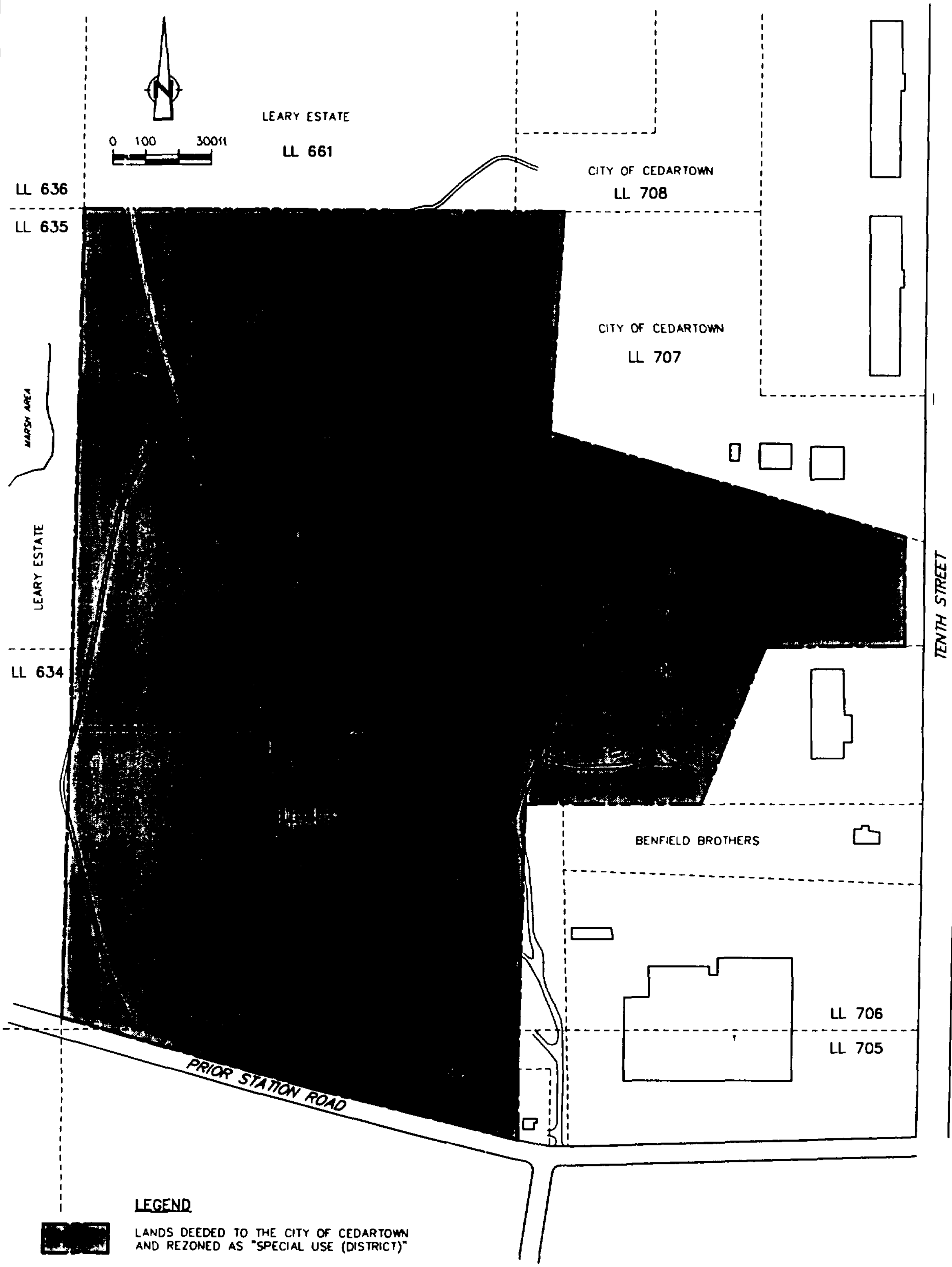


figure 1.3

LIMITS OF THE LANDFILL
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (12) DEC 01/97(A) REV.0 (P-17)

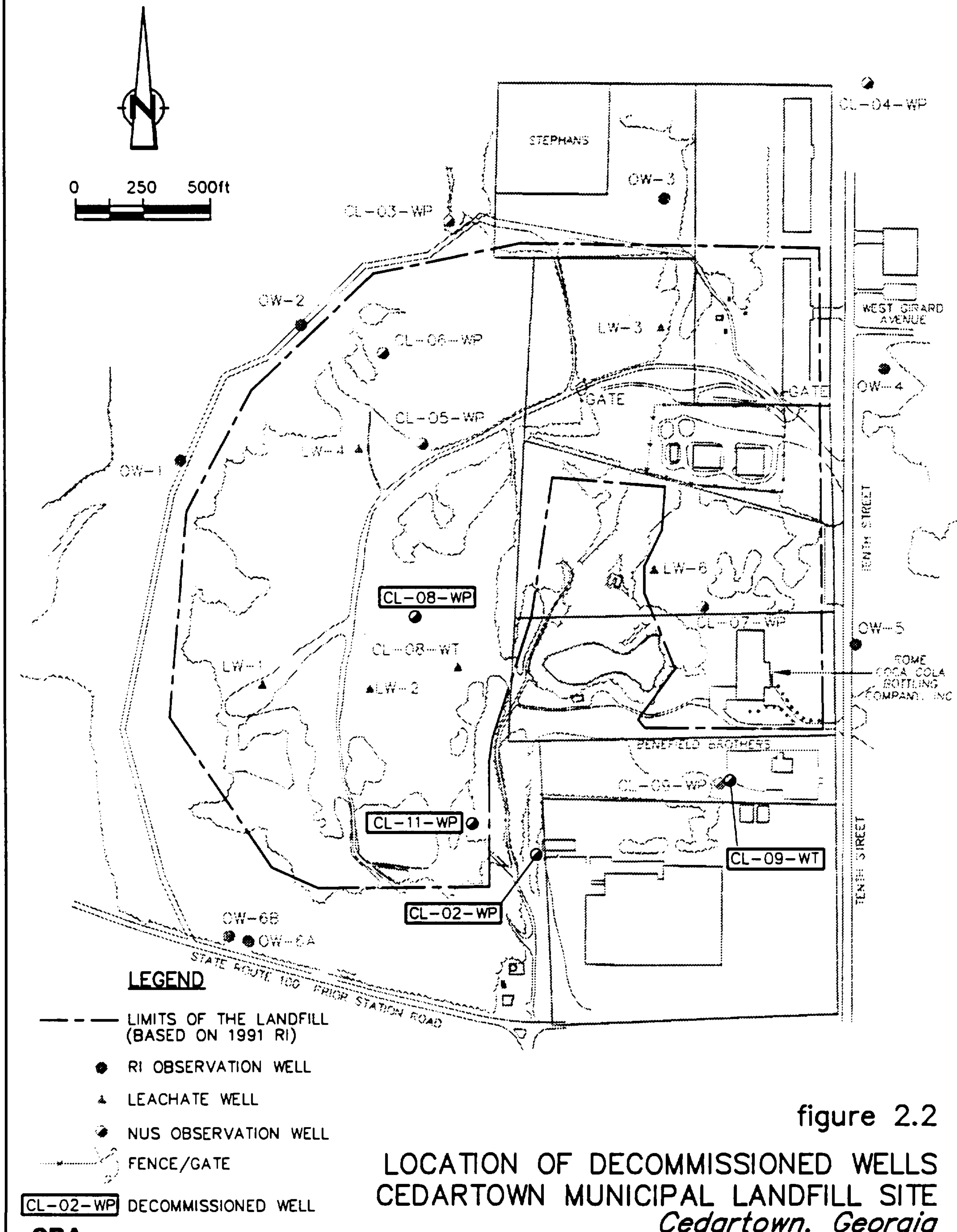


SOURCE: ELBERT H. ANGEL
CEDARTOWN, GEORGIA
JULY 15, 1994 (REVISED MARCH 8, 1995)

figure 2.1
ZONING MAP
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (12) DEC 01/97(A) REV.0 (P-16)



CRA

figure 2.2

LOCATION OF DECOMMISSIONED WELLS
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

3482 (12) DEC 01/97(A) REV.0 (P-18)

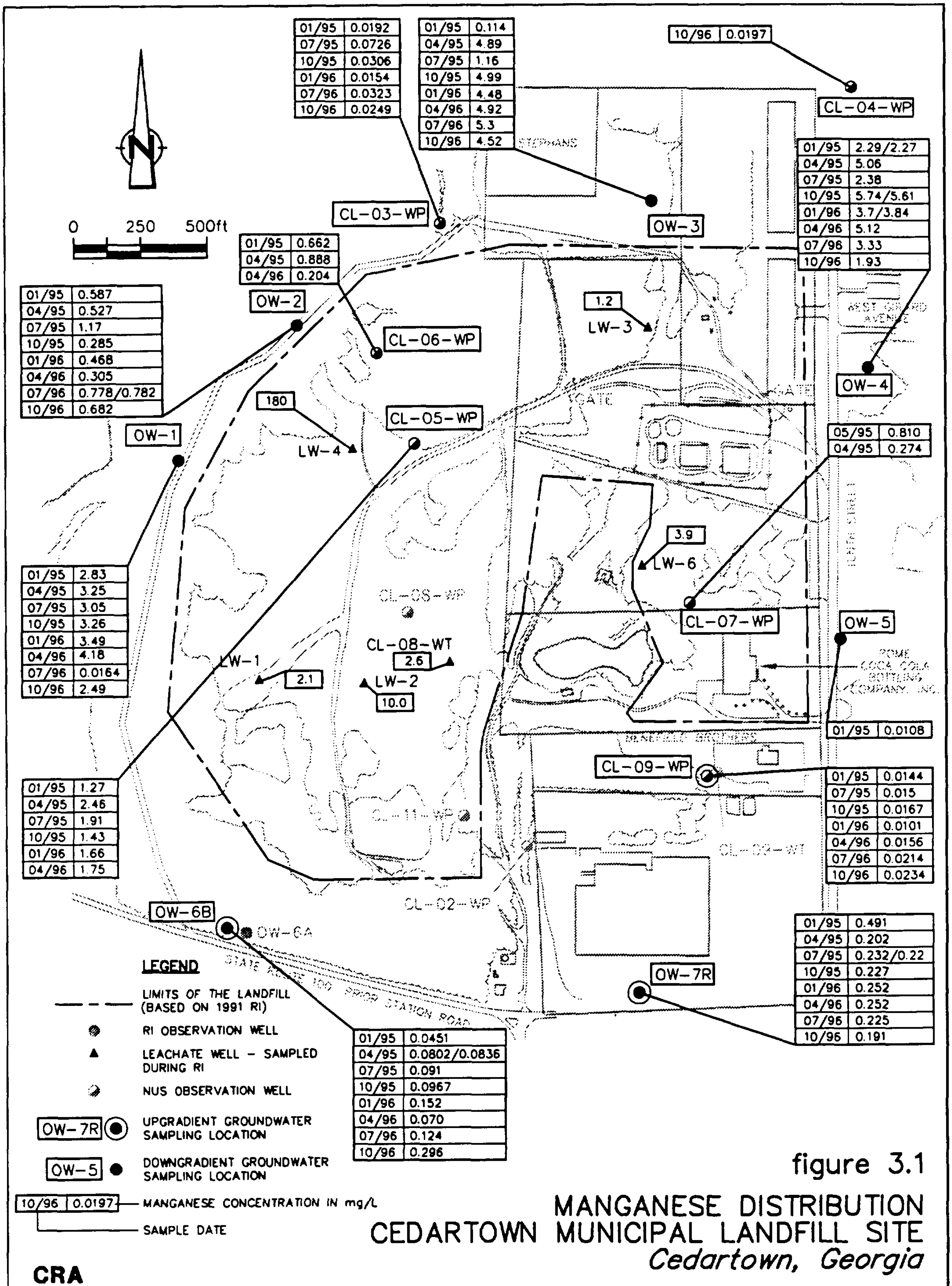


figure 3.1

MANGANESE DISTRIBUTION
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

3482 (12) DEC 01/97(A) REV.0 (P-20)

TABLES

TABLE 2.1

CONSTRUCTION DETAILS FOR NUS MONITORING WELLS DECOMMISSIONED
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Well No.	*Ground Elevation (ft. AMSL)(2)*	*Depth to Bedrock (ft. BGS)*	*Top of Well Elevation (ft. AMSL)*	*Screened Interval(3)*		*Bottom of Well*		*Screen Interval Lithologic Material*
				Elevation (ft AMSL)	*Depth (ft BGS) (4)*	*Elevation (ft AMSL)*	*Depth (ft BGS)*	
CL-02-WP	819.7	43.5	822.04	768.2 - 778.2	41.5 - 51.5	767.7	52.0	clay/limestone
CL-08-WP	854.5	--	856.21	751.0 - 761.0	93.5 - 103.5	750.5	104.0	siderite
CL-09-WT	802.5	--	803.18	781.5 - 786.5	16.0 - 21.0	781.0	21.5	clay
CL-11-WP	NA(5)	NA	NA	--	51.5 - 61.5	--	62.0	unknown

Notes:

(1) Source: NUS Corporation data.
(2) AMSL - Above mean sea level
(3) Depths are estimated
(4) BGS - Below Ground Surface
(5) NA - not available

TABLE 2.2

CONSTRUCTION DETAILS FOR MONITORING WELL NETWORK
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Well Number	Ground Elevation (Ft. AMSL) (1)	Top of Well Elevation (Ft. AMSL)	Screened Interval Elevation (Ft. AMSL)	Screened Interval Depth (Ft. BGS)	Bottom of Well Elevation (Ft. AMSL)	Bottom of Well Depth (Ft. BGS)	Screened Interval Lithologic Material
OW-1	820.79	823.80	761.79-771.79	49.0-59.0	760.79	60.0	Dolostone
OW-2	824.45	827.50	767.45-782.45	42.0-57.0	764.45	60.0	Dolostone
OW-3	801.50	803.29	Open Hole		608.50	193.0 (3)	Limestone
OW-4	799.00	801.52	739.0-749.0	50.0-60.0	730.00	69.0	Limestone
OW-5	795.42	797.92	712.42-732.42	63.0-83.0	710.42	85.0	Limestone
OW-6B	804.12	805.12	Open Hole		696.12	108.0 (4)	Limestone
OW-7R	806.70	809.30	724.70-734.70	72.0-82.0	724.70	88.0	Siderite
CL-03-WP	833.60	836.41	736.1-751.1	82.5-97.5	735.60	98.0	Clay/limestone
CL-04-WP	796.81	796.81	755.31-765.31	31.5-41.5	754.81	42.0	Limestone
CL-05-WP	850.10	853.34	733.6-743.6	106.5-116.5	733.10	117.0	Limestone
CL-06-WP	857.40	861.02	770.4-780.4	77.0-87.0	769.90	87.5	Limestone
CL-07-WP	823.30	824.90	793.3-803.3	20.0-30.0	792.80	30.5	Limestone
CL-09-WP	802.40	803.63	770.9-780.9	21.5-31.5	770.40	32.0	Limestone

Notes:

(1) AMSL - above mean sea level
(2) BGS - below ground surface
(3) Well has since collapsed to 646.50 Ft. AMSL or 155 Ft. BGS.
(4) Well has since collapsed to 752.12 Ft. AMSL or 52.0 Ft. BGS.
(5) Source: NUS Corporation

TABLE 3.1

GROUNDWATER CONTAMINANTS OF CONCERN AND PERFORMANCE STANDARDS
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Contaminant of Concern	*Performance Standard (μg/L)*
Manganese	840[a]
Beryllium	4[b]
Cadmium[c]	5[b]
Chromium[d]	100[b]
Lead	15[e]

a Revised USEPA groundwater protection level for manganese (November 1995).

b Safety Drinking Water Act Maximum Contaminant Level (MCL).

c Included due to contaminant concentrations and frequency of detection.

d While chromium was below detection during third sampling round, it was detected above standards in previous rounds. Therefore, it was retained for determining performance standards.

e EPA Action Level from Lead and Copper Rule, 56 FR, June 7, 1991.

TABLE 3.2

SURFACE WATER CONTAMINANTS OF CONCERN
AND PERFORMANCE STANDARDS
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Contaminant of Concern	*FAWQC (1, 2)* *Acute (µg/L)*	*Chronic (µg/L)*	*GSWQS (3)* *(µg/L)*
Aluminum	750 (4)	87 (4)	NA
Chromium	984	117	120 a
Copper	9	6.5	6.5 a
Lead	82	3.2	1.3 a
Nickel	1,400	160	88 a
Zinc	120	110	60 a

Notes:

FAWQC	-	Federal Ambient Water Quality Criteria.
GSWQS	-	Georgia State Water Quality Standards.
NA	-	Not Available.
ND	-	Not Detected.
a	-	Assumed Surface Water Hardness Š100 (as mg/L $CaCO_3$).

References:

(1)	-	USEPA Quality Criteria for Water 1986 EPA/440/5-86-001 May 1986, 51 Federal Register 43665, Update September 1987.
(2)	-	IRIS - EPA Integrated Risk Information System Database, July 1992.
(3)	-	Rules and Regulations for Water Quality Control, Chapter 391-3-6, 1993, Georgia Department of Natural Resources, Atlanta, Georgia.
(4)	-	EPA Region IV "Toxic Substance Spreadsheet", EPA Water Quality Standards Unit.

GROUNDWATER METALS RESULTS FOR BACKGROUND MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		*CL-09-WP*									
Sample ID:		*W-3482-JOS-010695-07*	*GW-3482-JOS-042695-022*	*GW-3482-JOS-072195-09*	*GW-3482-JOS-102695-11*	*GW-3482-JOS-010296-04(MS/MSD)*	*GW-3482-JOS-042496-14*	*GW-3482-JOS-071096-09*	*GW-3482-JOS 02396-02(MS/MSD)*	*GW-3482-020897-NP-01 (MS/MSD)*	*GW-3482-090997-JOS-02*
Date Sampled:		*1/6/95*	*4/26/95*	*7/21/95*	*10/26/95*	*1/2/96*	*4/24/96*	*7/10/96*	*10/23/96*	*2/8/97*	*9/9/97*
<u>Parameters</u>	<u>Units</u>										
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0050)	ND(0.0050)
Lead	mg/L	ND(0.005)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	**0.0144**	ND(0.0100)	**0.015**	**0.0167**	**0.0101**	**0.0156**	**0.0214**	**0.0234**	ND(0.0100)	**0.0151**

Location:		*OW-7R*										
Sample ID:		*W-3482-JOS-012395-15*	*GW-3482-JOS-042895-023*	*GW-3482-JOS-071995-01*	*GW-3482-JOS-071995-02*	*GW-3482-JOS-102495-03*	*GW-3482-JOS-010396-05*	*GW-3482-JOS-042496-11*	*GW-3482-JOS-071096-05*	*GW-3482-JOS-102496-07*	*GW-3482-021097-NP-06*	*GW-3482-091097-JOS-12 MS/MSD*
Date Sampled:		*1/23/95*	*4/28/95*	*7/19/95*	*7/19/95 (Dup)*	*10/24/95*	*1/3/96*	*4/24/96*	*7/10/96*	*10/24/96*	*2/10/97*	*9/10/97*
<u>Parameters</u>	<u>Units</u>											
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	**0.0101**	ND(0.0100)	ND(0.01)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	**0.011**	ND(0.0030)	ND(0.003)	ND(0.003)	ND(0.0030)	ND(0.0300)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	**0.491**	**0.202**	**0.232**	**0.22**	**0.227**	**0.252**	**0.252**	**0.225**	**0.191**	**0.167**	**0.202**

Note:

ND - Not detected at the reporting limit stated in parentheses.

GROUNDWATER METALS RESULTS FOR BACKGROUND MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		OW-6B										
Sample ID:		*W-3482-JOS-010595-02*	*GW-3482-JOS-042595-017*	*GW-3482-JOS-042595-18*	*GW-3482-JOS-072395-011*	*GW-3482-JOS-102695-13*	*GW-3482-JOS-010396-06*	*GW-3482-JOS-042496-12*	*GW-3482-JOS-071196-12*	*GW-3482-JOS-102896-12*	*GW-3482-021197-NP-04*	*GW-3482-091097-DJB-10*
Date Sampled:		*1/5/95*	*4/25/95*	*4/25/95* (Dup)	*7/23/95*	*10/26/95*	*1/3/96*	*4/24/96*	*7/11/96*	*10/28/96*	*2/11/97*	*9/10/97*
Parameters	**Units**											
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	**0.0162**	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.005)	**0.0050**	**0.0048**	ND(0.003)	ND(0.0030)	**0.0042**	**0.0036**	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	**0.0451**	**0.0802**	**0.0836**	**0.091**	**0.0967**	**0.152**	**0.070**	**0.124**	**0.296**	**0.0715**	**0.231**

Note:

ND - Not detected at the reporting limit stated in parentheses.

GROUNDWATER METALS RESULTS FOR INTERIOR MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		CL-05-WP							
Sample ID:		*W-3482-JOS-011095-11*	*GW-3482-JOS-042895-027*	*GW-3482-JOS-072195-08*	*GW-3482-JOS-102695-10*	*GW-3482-JOS-010496-13*	*GW-3482-JOS-042396-08*	*GW-3482-021297-NP-09*	*GW-3482-090997-JOS-08*
Date Sampled:		*1/10/95*	*4/28/95*	*7/21/95*	*10/26/95*	*1/4/96*	*4/23/96*	*2/12/97*	*9/9/97*
Parameters	**Units**								
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.003)	ND(0.0030)	0.003	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	1.27	2.46	1.91	1.43	1.66	1.75	1.68	2.08

Location:		CL-06-WP			CL-07-WP	
Sample ID:		*W-3482-JOS-011195-14*	*GW-3482-JOS-042795-026*	*GW-3482-JOS-042396-07*	*GW-3482-JOS-050295-029*	*GW-3482-JOS-042496-15*
Date Sampled:		*1/11/95*	*4/27/95*	*4/23/96*	*5/2/95*	*4/24/96*
Parameters	**Units**					
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	0.423	0.173	0.0103	0.230	0.398
Lead	mg/L	ND(0.003)	0.0046	ND(0.0030)	0.0268	0.0113
Manganese	mg/L	0.662	0.888	0.204	0.810	0.274

ND - Not detected at the reporting limit stated in parentheses.

GROUNDWATER METALS RESULTS FOR PERIMETER MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		OW-1									
Sample ID:		*W-3482-JOS-011095-09*	*W-3482-JOS-051095-028*	*GW-3482-JOS-072095-05*	*W-3482-JOS-102495-04*	*GW-3482-JOS-010396-10*	*GW-3482-JOS-042396-05*	*GW-3482-JOS-072696-01*	*GW-3482-JOS-102596-10*	*GW-3482-021797-NP-11*	*GW-3482-090997-JOS-06*
Date Sampled:		*1/10/95*	*5/10/95*	*7/20/95*	*10/24/95*	*1/3/96*	*4/23/96*	*7/26/96*	*10/25/96*	*2/17/97*	*9/9/97*
Parameters	**Units**										
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	**0.0104**	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	**2.83**	**3.25**	**3.05**	**3.26**	**3.49**	**4.18**	**0.0164**	**2.49**	**4.33**	**3.07**

Location:		OW-2											
Sample ID:		*W-3482-JOS-010595-01*	*GW-3482-JOS-042795-025*	*GW-3482-JOS-072095-06*	*GW-3482-JOS-102395-02*	*GW-3482-JOS-010396-09*	*GW-3482-JOS 042396-06(MS/MSD)*	*GW-3482-JOS 071096-06*	*GW-3482-JOS 071096-07*	*GW-3482-JOS-102496-06*	*GW-3482 021297*	*GW-3482 090997-JOS-01*	*GW-3482 090997-JOS-04*
Date Sampled:		*1/5/95*	*4/27/95*	*7/20/95*	*10/23/95*	*1/3/96*	*4/24/96*	*7/10/96*	*7/10/96 (Dup)*	*10/24/96*	*2/12/97*	*9/9/97*	*9/9/97 (Dup)*
Parameters	**Units**												
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.005)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	**0.0171J**	**0.0088J**
Manganese	mg/L	**0.587**	**0.527**	**1.17**	**0.285**	**0.468**	**0.305**	**0.778**	**0.782**	**0.682**	**0.191**	**1.22**	**1.26**

ND - Not detected at the reporting limit stated in parentheses.
J - Estimated result

CRA 3482 (15)

GROUNDWATER METALS RESULTS FOR PERIMETER MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		OW-3									
Sample ID:		W-3482-JOS-011095-10	GW-3482-JOS-042695-024	W-3482-JOS-072295-010	GW-3482-JOS-102695-012	GW-3482-JOS-010496-11	GW-3482-JOS-042396-10	GW-3482-JOS-071196-11	GW-3482-JOS-102496-09	GW-3482-021897-NP-13	GW-3482-091097-DJB-11
Date Sampled:		1/10/95	4/26/95	7/22/95	10/26/95	1/4/96	4/23/96	7/11/96	10/24/96	2/18/97	9/10/97
Parameters	**Units**										
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.003)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	0.114	4.89	1.16	4.99	4.48	4.92	5.3	4.52	4.83	4.64

Location:		OW-4												
Sample ID:		W-3482-JOS-010695-04	W-3482-JOS-010695-05	GW-3482-JOS-042595-019	W-3482-JOS-071995-04	GW-3482-JNP-102595-05	GW-3482-JNP-102595-06	GW-3482-JOS-010296-02	GW-3482-JOS-010296-03	GW-3482-JOS-042496-13	GW-3482-JOS-070996-02	GW-3482-JOS 102396-05	GW-3482-021097 NP-05	GW-3482-090997 DJB-007
Date Sampled:		1/6/95	1/6/95 (Dup)	4/25/95	7/19/95	10/25/95	10/25/95 (Dup)	1/2/96	1/2/96 (Dup)	4/24/96	7/9/96	10/23/96	2/10/97	9/9/97
Parameters	**Units**													
Beryllium	mg/L	ND(0.005)	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.005)	ND(0.005)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	2.29	2.27	5.06	2.38	5.74	5.61	3.7	3.84	5.12	3.33	1.93	7.66	2.11

Location:		OW-5											
Sample ID:		W-3482-JOS-010695-06	GW-3482-JOS-042595-020	W-3482-JOS-072095-07	GW-3482-JNP-102595-07	GW-3482-JOS-010496-12	GW-3482-JOS-042296-04	GW-3482-JOS-071096-04	GW-3482-JOS-102396-03	GW-3482-JOS-102396-04	GW-3482-020997-NP-03	GW-3482-020997-NP-04	GW-3482-090997-JOS-03
Date Sampled:		1/6/95	4/25/95	7/20/95	10/25/95	1/4/96	4/22/96	7/10/96	10/23/06	10/23/06 (DUP)	2/09/97	2/09/97 (DUP)	9/09/97
Parameters	**Units**												
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.005)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	0.0108	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)

ND - Not detected at the reporting limit stated in parentheses
J - Estimated result

GROUNDWATER METALS RESULTS FOR PERIMETER MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		*CL-03-WP*									
Sample ID:		*W-3482-JOS-010995-08*	*GW-3482-JOS-042695-021*	*W-3482-JOS-071995-03*	*GW-3482-JOS-102595-09*	*GW-3482-JOS-010396-07*	*GW-3482-JOS-042396-09*	*GW-3482-JOS-072696-02*	*GW-3482-JOS-102596-11*	*GW-3482-021797-NP-12*	*GW-3482-090997-DJB-05*
Date Sampled:		*1/9/95*	*4/26/95*	*7/19/95*	*10/25/95*	*1/3/96*	*4/23/96*	*7/26/96*	*10/25/96*	*2/17/97*	*9/9/97*
Parameters	**Units**										
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.0100)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.003)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	0.0192	ND(0.0100)	0.0726	0.0306	0.0154	ND(0.0100)	0.0323	0.0249	ND(0.0100)	0.0766

Location:		*CL-04-WP*								
Sample ID:		*W-3482-JOS-010695-03*	*GW-3482-JOS-042595-016*	*GW-3482-JOS-102395-01*	*GW-3482-JOS-010296-01*	*GW-3482-JOS-042296-02*	*GW-3482-JOS-042296-03*	*GW-3482-JOS-070996-01*	*GW-3482-JOS-102396-01*	*GW-3482-020997-NP-02*
Date Sampled:		*1/6/95*	*4/25/95*	*10/23/95*	*1/2/96*	*4/22/96*	*4/22/96 (Dup)*	*7/9/96*	*10/23/96*	*2/09/97*
Parameters	**Units**									
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.005)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	0.0197	ND(0.0100)

ND - Not detected at the reporting limit stated in parentheses.
J - Estimated result

SURFACE WATER METALS RESULTS
REMEDIAL ACTION SURFACE WATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		*Coke Pond*				
Sample ID:		*SW-3482-JOS-011195-13*	*SW-3482-JOS-042895-002*	*SW-3482-JOS-072195-01*	*SW-3482-JOS-102595-01*	*SW-3482-JOS-010396-01*
Date Sampled:		*1/11/95*	*4/28/95*	*7/21/95*	*10/25/95*	*1/3/96*
Parameters	**Units**					
Aluminum	mg/L	ND(0.2)	ND(0.200)	1.87	ND(0.200)	ND(0.200)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)
Copper	mg/L	0.018	ND(0.0050)	0.018	ND(0.0050)	ND(0.0050)
Lead	mg/L	ND(0.003)	ND(0.0030)	0.0222	ND(0.0030)	ND(0.0030)
Nickel	mg/L	ND(0.04)	ND(0.0400)	ND(0.04)	ND(0.0400)	ND(0.0400)
Zinc	mg/L	ND(0.02)	ND(0.0200)	0.085	ND(0.0200)	ND(0.0200)

Location:		*Coke Pond*		
Sample ID:		*SW-3482-JOS-042496-01*	*SW-3482-JOS-071196-01*	*SW-3482-JOS-102896-01*
Date Sampled:		*4/24/96*	*7/11/96*	*10/23/96*
Parameters	**Units**			
Aluminum	mg/L	ND(0.200)	ND(0.200)	ND(0.200)
Chromium	mg/L	ND(0.0100)	ND(0.0100)	ND(0.0100)
Copper	mg/L	ND(0.0050)	ND(0.0050)	ND(0.0050)
Lead	mg/L	ND(0.0030)	ND(0.0030)	ND(0.0030)
Nickel	mg/L	ND(0.0400)	ND(0.0400)	ND(0.0400)
Zinc	mg/L	0.0234	0.0247	0.0221

ND - Not detected at the reporting limit stated in parentheses.

TABLE 3.7

STATISTICAL ANALYSES - PERIMETER MONITORING WELLS
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

	Well	*Mean (y) (mg/L)*	*Standard Deviation (S_y)*	*Variance (S_y^2)*	*t-Statistic (t^*)*	*Critical Comparison Statistic (t_c)*	*Significant Difference*
Manganese	OW-1	2.82	1.24	1.54	4.52	2.365	Yes (higher)
	OW-2	0.62	0.27	0.07	-2.44	2.306	Yes (lower)
	OW-3	3.8	1.99	3.96	4.21	2.365	Yes (higher)
	OW-4	3.75	1.44	2.07	6.7	2.228	Yes (higher)
	OW-5	0.006	0.002	4×10^{-6}	-1,251	2.306	Yes (lower)
	CL-03-WP	0.026	0.022	0.0005	-104.7	2.365	Yes (lower)
	CL-04-WP	0.007	0.005	3×10^{-5}	-471.2	2.365	Yes (lower)
Chromium	OW-1	0.006	0.002	4×10^{-6}	-132.9	2.365	Yes (lower)
	OW-2	ND	--	--	--	--	--
	OW-3	ND	--	--	--	--	--
	OW-4	ND	--	--	--	--	--
	OW-5	ND	--	--	--	--	--
	CL-03-WP	ND	--	--	--	--	--
	CL-04-WP	ND	--	--	--	--	--

<u>Assumptions:</u>

1. Non-detect concentrations were assumed to equal one-half the detection limit.
2. Duplicate data are considered discrete sample points.
3. Performance standard for manganese is 0.84 mg/L.
4. Performance standard for chromium is 0.1 mg/L.

A

APPENDIX A

ZONING ORDINANCE

CEDARTOWN. GEORGIA

CERTIFICATION OF ORDINANCE

CITY OF CEDARTOWN

I, EMILY C. SHAW, AS CITY CLERK AND CUSTODIAN OF RECORDS FOR THE CITY OF CEDARTOWN, HEREBY CERTIFY THAT THE ATTACHED ORDINANCE IS A TRUE AND CORRECT COPY OF ORDINANCE NO. 14. 1996, ZONING. AS CONTAINED ON FILE IN THE CITY CLERKS OFFICE OF THE CITY OF CEDARTOWN.

THIS THE 6th DAY OF DECEMBER. 1996.

SIGNED: Emily C Shaw
CITY CLERK

ORDINANCE NO. 14, 1996

AN ORDINANCE BY THE CITY COMMISSION
OF THE CITY OF CEDARTOWN, GEORGIA

WHEREAS, there is a need to change the districts within the zoning code of the City of Cedartown, as contained in appendix "B" entitled "zoning", As to article four (IV) thereof; and

WHEREAS, recently the City of Cedartown has determined it necessary to acquire certain property to be annexed to the City of Cedartown, which said property was formerly used for the disposal of municipal solid waste in the city and was the former site of the "Cedartown Landfill"; and

WHEREAS, the Commission desires to restrict the zoning within the uses of this property, and must therefore create another zoning classification within the city concerning this special use; and

WHEREAS, in the future there may be certain additional special use zoning classifications for the uses hereinafter defined or similar problems which may result in amendments of the zoning ordinance of the City of Cedartown is such special circumstances; and

WHEREAS, there is a need by this ordinance to adopt certain provisions to authorize these changes in this ordinance;

Now, Therefore, be it ordained by the City Commission of the City of Cedartown, and is hereby ordained and established by said authority as follows:

Section 1:

This ordinance shall be first read and reviewed by the Commission at its September, 1996 meeting. A public notice concerning these proposed changes in the zoning code of the City of Cedartown shall, after the ordinance has been reviewed, be published in the Cedartown Standard. Said notice is attached here to exhibit "A" and made apart hereof by reference. Public comments shall be obtained before final approval of these amendments, at a public hearing to be called and held at the regular October meeting of the City Commission of the City of Cedartown, to be held on Monday, October 14, 1996 at seven o'clock in the evening.

Section 2:

The Code of the City of Cedartown as contained in appendix "B" thereof, in article four shall stand amended by adding to section 4.1 thereof entitled "Division into Districts" the following two new additional districts or designations to be defined as follows:

"SU-1 special use (restricted) district

SU-2 (Special Use Classification)"

Section 3:

The Code of the City of Cedartown shall stand further amended as to Appendix "B" article seven (VII) entitled "Use Requirements by District", by adding thereto a new section to be designated as section 7.10. Said section shall read as follows:

"Sec.7.10. Special Use (Restricted) district"

Within a special use (Restricted) district, the following uses shall be permitted:

7.10.1. The planting of permanent vegetation, ground cover, timber or any other vegetation to prevent erosion, sedimentation or to prevent soil disturbance in the designated district.

7.10.2. The property in this classification has previously been declared to potentially be a threat to human health and the environment; or could be potentially such a threat, based upon either federal regulations, state procedures and\or local decisions of the zoning and planning commission of the City of Cedartown. As such, no improvements which would allow human occupation of the property, no ground water collection facilities, ponds, lakes; nor any wells (drinking water, commercial use wells, raw water or any other type wells) shall be permitted in this district.

Section 4:

The Code of the City of Cedartown shall stand further amended by creating a new article eight (VIII) to Appendix "B"-

Zoning which shall be entitled "Article VIII-Special Use Classification District". This new article shall read as follows:

ARTICLE VIII (8). SPECIAL USE DISTRICT

a) A "Special Use District" shall be defined as a district which creates , adjacent to abutting Residential, Commercial, or Industrial zones, a certain new classification of property based upon a "Special Use" of said property, or special stipulations concerning the use of the property; since the property because of its unique character, location or use does not fit within the general use requirements by districts, as contained in article VII hereof. This use classification is based upon either special conditions for the use of the property, certain restrictions that will be applied to the use, or other similar circumstances so that the property thereafter will be designated with the Special Use. As an example, An "R-1" use could have a further classification of "SU" Appended to it in that the residential single family dwellings to be built upon the property shall be based upon lots with either additional set back requirements as those contained in the subdivisions regulations, square footage use restriction, or other similar restrictions that may be placed by the developer of the property; or Special Uses placed upon the property by the ~~the~~ city in connection with any review and approval of zoning of the property.

b) The use to be permitted by this designation either as a special district under this article, or as a designation within any other Residential, Commercial or Industrial District, shall consider the following uses and matters affecting the property:

1) The use and zoning of surrounding property;
2) The need for a special buffer, special circumstances with regard to the zoning

classification, for other special use requirement of the property based upon location, terrain, size, topography or similar criteria;

3) The overall zoning development plan of the City of Cedartown as it relates to the geographical district within one square mile radius of the location of the property;

4) Environmental conditions, uses, concerns for similar requirements;

5) The submitted development plan, or proposed building plan of the property.

6) Other criteria as may be established by the planning commission or building inspector of the City of Cedartown in a review of any requested zoning.

Section 5:

All laws or parts of laws in conflict herewith are specifically repealed. In the event any portion of this ordinance should be declared unconstitutional or otherwise unenforceful, all remaining portions thereof shall continue in full force and effect.

ADOPTED AND APPROVED by the City Commission of the City of Cedartown on the 14th day of October, 1996, at a regular meeting thereof, duly called and held, all Commissioners voting "Aye", none voting "No".

APPROVED:

By: Bert Wood

CHAIRMAN, CEDARTOWN CITY COMMISSION

ATTEST:

SECRETARY, CEDARTOWN CITY COMMISSION

EXHIBIT "A"

NOTICE OF ZONING AMENDMENT-CITY OF CEDARTOWN

Notice is hereby given that an ordinance has been introduce at the September, 1996 meeting of the Cedartown City Commission which, if adopted would make some changes in the zoning code of th city. The first change would be to create a special restricted use classification for property, so that property which may b environmentally hazardous, subject to environmental investigations, or otherwise in need of special restrictions could be so classifie pursuant to the zoning ordinances of Cedartown.

The Ordinance also would create a "Special Use Classification" which could be added to the existing zoning restrictions of th City of Cedartown, or create a Special Use District for property based upon the property's unique topography, uses to be made of th property, the need for zoning buffers, or similar matters.

The effect of this ordinance is to create two new zonin classifications which will be used in the future in making decisions concerning zoning within the City of Cedartown. A cop of the proposed ordinance amendments is on file in the office of the Clerk at City Hall. The document is available for publi inspection during normal business hours.

A Public Hearing, concerning this proposed zoning ordinanc amendment shall be conducted at the October regular meeting of the City Commission of the City of Cedartown, to be held on October 14 1996 at seven o'clock (7:00) in the evening.

This 9th day of September, 1996.

Emily C. Shaw

Emily C. Shaw, City Clerk
City of Cedartown

9/18/96

279

EXHIBIT "A"
NOTICE OF
ZONING AMENDMENT
CITY OF CEDARTOWN

Notice is hereby given that an ordinance has been introduced at the September, 1996 meeting of the Cedartown City Commission which, if adopted would make some changes in the zoning code of the city. The first change would be to create a special restricted use classification for property, so that property which may be environmentally hazardous, subject to environmental investigations, or otherwise in need of special restrictions could be so classified pursuant to the zoning ordinances of Cedartown.

The Ordinance also would create a "Special Use Classification" which could be added to the existing zoning restrictions of the City of Cedartown, or create a Special Use District for property based upon the property's unique topography, uses to be made of the property, the need for zoning buffers, or similar matters.

The effect of this ordinance is to create two new zoning classifications which will be used in the future in making decisions concerning zoning within the City of Cedartown. A copy of the proposed ordinance amendments is on file in the office of the Clerk at City Hall. The document is available for public inspection during normal business hours.

A Public Hearing, concerning this proposed zoning ordinance amendment shall be conducted at the October regular meeting of the City Commission of the City of Cedartown, to be held on October 14, 1996 at seven o'clock (7:00) in the evening.

This 9th day of September, 1996.

Emily C. Shaw, City Clerk
City of Cedartown
September 19, 26, 1996

B

APPENDIX B

PRE-FINAL CONSTRUCTION REPORT

ATTACHMENT A

November 25, 1994 Reference No. 3482

DECOMMISSIONING PROCEDURES
MONITORING WELL CL-08-WP
CEDARTOWN MUNICIPAL LANDFILL SITE

1.0 MONITORING WELL DETAILS

(Note: the following details were found on the NUS well log.)

Surface Casing:	8-inch diameter, set to a depth of 33 feet bgs
Borehole diameter:	Not stated. Assumed to be six or eight inches
Riser Pipe Material:	Stainless steel (Schedule unknown, likely Sch 5)
Riser Pipe Diameter:	2-inches
Well Screen Material:	Stainless steel
Well Screen Diameter:	2-inches
Depth of Well Screen:	103.5 feet bgs

2.1 DECOMMISSIONING PROCEDURES

1. Remove above ground protective casing from the monitoring well by excavating by hand around the well.

2. Check 2-inch diameter pipe for plumbness and alignment by lowering a 3-foot PVC dummy into the well. Note any areas of problems.

3. Set up drill rig over the well.

4. Commence coring with a 4-inch outside diameter core barrel. (Note circulation water must be potable water from the City of Cedartown's municipal water supply system.) All drilling water will be contained and transferred to the on-Site storage tanks.

4. Continue coring operation to 105 feet bgs, if possible. Remove all 2-inch diameter screen and riser pipe. Note: **if the core barrel cannot be kept straight during coring go to contingency procedure.**

5. Remove coring equipment and install tremie pipe into the borehole. Pump pure bentonite grout into the well to three feet below ground surface. Allow grout to set over night.

6. The following day top up the bentonite grout to three feet bgs, if required. Excavate around the 8-inch diameter surface casing to a

3.0 CONTINGENCY PROCEDURES

1. If the augers go off line during coring operations attempt to return coring barrel/augers to a plumb alignment.

2. If this is not possible, cut the stainless steel pipe off at the depth of problem. (**Note: The minimum acceptable depth at which the 2-inch diameter pipe can be cutoff is 20 feet bgs.**) Remove coring equipment or augers and cutoff 2-inch diameter pipe.

3. Lower the tremie tube into the well and, if possible, into the 2-inch diameter pipe. Pump grout into the 2-inch diameter pipe and the borehole up to a depth of three feet bgs. Allow the grout to set overnight.

4. Complete the closure as specified in 6. above.

4.0 EQUIPMENT DECONTAMINATION

1. Move all down-hole equipment to the existing on-Site decontamination pad.

2. Clean all equipment with clean hot water under high pressure. Contain all decontamination water in the on-Site tanks.

5.0 WASTE MATERIAL HANDLING

1. As the well is off the landfill and on private lands, all drilling water must be contained and transferred to the on-Site tanks.

2. Drill cuttings can be used to backfill the upper three feet of the hole, with the remainder hauled back to the landfill for spreading at a place designated by CRA.

3. Contractor generated non-hazardous waste is to be removed by the Contractor.

November 25, 1994 Reference No. 3482

DECOMMISSIONING PROCEDURES
MONITORING WELL CL-02-WP
CEDARTOWN MUNICIPAL LANDFILL SITE

1.0 MONITORING WELL DETAILS

(Note: the following details were found on the NUS well log.)

Surface Casing:	None
Borehole diameter:	Not stated. Assumed to be eight inches
Riser Pipe Material:	Stainless steel (Schedule unknown, likely Sch 5)
Riser Pipe Diameter:	2-inches
Well Screen Material:	Stainless steel
Well Screen Diameter:	2-inches
Depth of Well Screen:	51.5 feet bgs

2.1 DECOMMISSIONING PROCEDURES

1. Remove above ground protective casing from the monitoring well by excavating by hand around the well.

2. Check 2-inch diameter pipe for plumbness and alignment by lowering a 3-foot PVC dummy into the well. Note any areas of problems.

3. Set up drill rig over the well.

4. Commence coring with a 4-inch outside diameter core barrel or over auger with 4 1/4 -inch inside diameter continuous flight augers. (Note if coring is used, circulation water must be potable water from the City of Cedartown's municipal water supply system.) All drilling water will be contained and transferred to the on-site storage tanks.

4. Continue coring/augering operation to 53 feet bgs, if possible. Remove all 2-inch diameter screen and riser pipe. **Note: if the core barrel/augers cannot be kept straight during drilling go to contingency procedure.**

5. Remove coring equipment or augers and install tremie pipe into the borehole. Pump pure bentonite grout into the well to three feet below ground surface. Allow grout to set over night.

were installed ten feet above the depths reported by NUS. The reported installed depths and the actual measured depths of all four wells are presented in Table 1.

The following paragraphs summarize the decommissiong activities. Any deviations from these procedures will be explained in the following text.

Monitoring Well CL-02-WP

Monitoring well CL-02-WP was first checked for straightness with PVC pipe and sounded for a total depth and found to be installed at a depth of 42 feet BGS. The 2-inch diameter stainless steel riser pipe and screen were overcored using a 4-inch diameter diamond core bit using air-rotary techniques for the entire depth of the well. Upon reaching the target depth, all of the stainless steel material was removed from the borehole and the borehole was grouted from the bottom up using the tremie method. The area surrounding the borehole was cleaned up and an attempt was made to restore the area to original condition.

Monitoring Well CL-08-WP

After sounding CL-08-WP for a total depth of 92 feet BGS, an attempt was made to overcore the 2-inch diameter stainless steel riser and screen. An undetermined impenetrable obstruction at approximately 3 feet BGS prevented the removal of any stainless steel well material; therefore, the well material was grouted in place from the bottom up using the tremie method. The 8-inch diameter surface casing, 4-inch diameter protective casing, and 2-inch diameter stainless steel riser were cut off two feet below grade and removed. The area surrounding the borehole was then restored to original condition.

Monitoring Well CL-09-WT

Monitoring well CL-09-WT was sounded and checked for straightness to a depth 22 feet BGS. This depth is approximately the same as that reported by NUS. The 2-inch diameter stainless steel riser and screen were then overcored using a 4-inch diameter diamond core bit and air-rotary technique. All the stainless steel well material was removed from the borehole and the borehole grouted from the bottom up using the tremie method. The area surrounding the borehole was cleaned up and restored to original condition.

CONESTOGA-ROVERS & ASSOCIATES
1351 Oakbrook Drive, Suite 150
Norcross, Georgia 30093
(404) 441-0027 Fax (404) 441-2050

December 29, 1994

Reference No. 3482

Ms. Annie Godfrey
Remedial Project Manager
South Superfund Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

Dear Ms. Godfrey:

Re: Pre-Final Construction Report
Cedartown Municipal Landfill Site - Cedartown, Georgia

INTRODUCTION

In accordance with the approved Remedial Action/Remedial Design (RD/RA) Work Plan for the Cedartown Municipal Landfill (CML) Site, four existing groundwater monitoring wells (CL-02-WP, CL-08-WP, CL-09-WT and CL-11-WP) were decommissioned and one upgradient groundwater monitoring well (OW-7) was installed. These activities were performed by Richard Simmons Drilling Co., Inc. and were conducted during the periods of December 13 - 15 and December 19 - 21, 1994. This letter report details the above activities.

This report was not included in the approved RD/RA Work Plan. However, the content and schedule for the Pre-Final Construction Report were established in a letter dated December 4, 1994 (Mateyk to Godfrey).

MONITORING WELL DECOMMISSIONING

Groundwater monitoring wells CL-02-WP, CL-08-WP, CL-09-WT and CL-11-WP, previously installed by NUS, were decommissioned according to the methods presented in the approved RD/RA Work Plan. These procedures were general in nature. Therefore, detailed well specific protocols were prepared for the field personnel to follow. The well specific decommissioning procedures are presented in Attachment A.

Initially, each well to be decommissioned was sounded to verify the total depth. It should be noted that the depths of monitoring well installations, CL-02-WP, CL-08-WP and CL-11-WP as reported by NUS, were reported incorrectly. These monitoring wells

Monitoring Well CL-11-WP

After checking for straightness and sounding monitoring well CL-11-WP for a total depth of 52 feet BGS, an attempt was made to overcore the 2-inch diameter stainless steel riser and screen. A 4-inch diameter diamond core bit and air-rotary technique was used. During the coring of this well, the core barrel went off line at a depth of 22 feet BGS. Although several attempts were made to realign the core barrel, all subsequent attempts failed. Therefore, the upper 22 feet of stainless steel riser was removed and the remaining well material and borehole were grouted from the bottom up using the tremie method. The area surrounding the borehole was cleaned up and restored to original condition.

UPGRADIENT MONITORING WELL INSTALLATION

The upgradient monitoring well location, OW-7, is located approximately 300 feet south of the limits of the Site in order to monitor the groundwater quality prior to the groundwater passing beneath the Site. This location was moved 140 feet north of the proposed location due to unfavorable surface water runoff conditions.

Monitoring well OW-7 was installed utilizing 6-1/4-inch inside diameter (10-inch outside diameter) hollow-stem augers to bore through the overburden. Soil samples for geologic record were collected at 5-foot intervals until auger refusal in order to describe and classify the soil. The soil samples were classified using the Unified Soil Classification System (USCS) and will be stored at the City for a period of one year. Although the soil samples were screened for the presence of volatile organic contamination using an organic vapor analyzer, no values above background were detected. All soil cuttings were placed in a drum and transported to the landfill.

Upon auger refusal, the hollow stem augers were removed from the borehole. The borehole was then reamed to ten inches in diameter using a tricone bit and wet-rotary drilling methods. The 10-inch diameter hole was advanced two feet into competent bedrock. Steel casing, six inches in diameter, was installed in the borehole where it was grouted in place from the bottom up using a tremie pipe placed at the bottom of the borehole. Grout was continually pumped until undiluted grout returned to the surface. At this time, the casing was pushed into the bedrock notch to further seal the annulus. With approval from on-Site USEPA personnel, the seal was allowed to set for a period of 16 hours prior to commencing bedrock coring.

All coring was performed in accordance with ASTM-D2113-83, using clean potable water as the circulation medium. The core hole was advanced using an "N" sized core barrel (1.88-inch diameter core and 2.98-inch hole). Due to the karst nature of the geology in the Cedartown area, only four feet of bedrock was encountered prior to penetrating a clay-filled cavern.

The core run was retrieved, laid in a core box and visually inspected by a geologist. The core was logged noting fractures, aperture size, orientation, spacing, filling, roughness and discontinuity type. Rock quality designations, water loss and gains, and any staining or secondary mineralization within the fractures were also noted. The core box was labeled indicating job name, job number, hole number, run number, run interval and date. The core box was stored in the on-Site warehouse and will remain there for a period of one year.

Upon completing the bedrock coring, the core hole was reamed to six inches in diameter to a target depth of 25 feet BGS using wet rotary techniques. The drilling fluid was circulated to remove rock cuttings from the borehole and containerized.

At the completion of the well, a locking protective cap was installed and a concrete pad (3 feet x 3 feet x 1 foot) built around it.

A draft stratigraphic log and instrumentation sketch for this monitoring well is provided as Attachment B. A final stratigraphic and well instrumentation log will be submitted with the Final Construction Report.

Development and surveying of monitoring well OW-7 will be undertaken in January 1995. The details of these activities will be presented in the Final Construction Report.

WASTE MATERIAL HANDLING

All wastes generated during the activities were transported back on Site and temporarily stored in drums. All soil material will be spread on Site as approved by USEPA in a letter dated December 8, 1994 (Godfrey to Johnson). This letter is provided in Attachment C. All drilling water will be transported and disposed of at the City of Cedartown POTW.

If you have any questions or require additional information, please contact the writer at your convenience.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

John Schwaller

JS/bl/2

c.c. Madeline Kellam - GAEPD
David Johnson - City of Cedartown
Hadley Bedbury - Maxus
Gordon Tate - Superior Consultants
Holly Kline - Alston & Bird
Michael Mateyk - CRA

TABLE 1

NUS MONITORING WELL INSTALLATION DEPTHS
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Well Number	*Installation Depth (1)*	*Sounded Depth (2)*
CL-02-WP	51.5	42
CL-08-WP	103.5	92
CL-09-WT	21.5	22
CL-11-WP	62	52

Notes:

(1) Installation depth as reported by NUS in feet below ground surface (BGS).
(2) Installation depth as field measured by CRA on December 13 - 15, 1994 in feet BGS.

November 25, 1994 Reference No. 3482

DECOMMISSIONING PROCEDURES
MONITORING WELL CL-11-WP
CEDARTOWN MUNICIPAL LANDFILL SITE

1.0 MONITORING WELL DETAILS

(Note: the following details were found on the NUS well log.)

Surface Casing:	None
Borehole diameter:	Not stated. Assumed to be eight inches
Riser Pipe Material:	Stainless steel (Schedule unknown, likely Sch 5)
Riser Pipe Diameter:	2-inches
Well Screen Material:	Stainless steel
Well Screen Diameter:	2-inches
Depth of Well Screen:	62 feet bgs

2.1 DECOMMISSIONING PROCEDURES

1. Remove above ground protective casing from the monitoring well by excavating by hand around the well.

2. Check 2-inch diameter pipe for plumbness and alignment by lowering a 3-foot PVC dummy into the well. Note any areas of problems.

3. Set up drill rig over the well.

4. Commence coring with a 4-inch outside diameter core barrel or over auger with 4 1/4 -inch inside diameter continuous flight augers. (Note if coring is used, circulation water must be potable water from the City of Cedartown's municipal water supply system.) All drilling water will be contained and transferred to the on-Site storage tanks.

4. Continue coring/augering operation to 62 feet bgs, if possible. Remove all 2-inch diameter screen and riser pipe. **Note: if the core barrel/augers cannot be kept straight during drilling go to contingency procedure.**

5. Remove coring equipment or augers and install tremie pipe into the borehole. Pump pure bentonite grout into the well to three feet below ground surface. Allow grout to set over night.

6. The following day top up the bentonite grout to three feet bgs, if required. Backfill the hole with soil to existing grade and cleanup the site.

3.0 CONTINGENCY PROCEDURES

1. If the core barrel or augers goes off line during coring operations attempt to return coring barrel/augers to a plumb alignment.

2. If this is not possible, cut the stainless steel pipe off at the depth of problem. (**Note: The minimum acceptable depth at which the 2-inch diameter pipe can be cutoff is 20 feet bgs.**) Remove coring equipment or augers and cutoff 2-inch diameter pipe.

3. Lower the tremie tube into the well and, if possible, into the 2-inch diameter pipe. Pump grout into the 2-inch diameter pipe and the borehole up to a depth of three feet bgs. Allow the grout to set overnight.

4. Complete the closure as specified in 6. above.

4.0 EQUIPMENT DECONTAMINATION

1. Move all down-hole equipment to the existing on-Site decontamination pad.

2. Clean all equipment with clean hot water under high pressure. Contain all decontamination water in the on-Site tanks.

5.0 WASTE MATERIAL HANDLING

1. All drilling water will be contained and transferred to the on-site storage tanks pending approval for disposal at the City of Cedartown POTW.

2. Drill cuttings can be used to backfill the upper three feet of the hole, with the remainder spread on the surface of the landfill.

3. Contractor generated non-hazardous waste is to be removed by the Contractor.

November 25, 1994 Reference No. 3482

DECOMMISSIONING PROCEDURES
MONITORING WELL CL-09-WT
CEDARTOWN MUNICIPAL LANDFILL SITE

1.0 MONITORING WELL DETAILS

(Note: the following details were found on the NUS well log.)

Surface Casing:	None
Borehole diameter:	Not stated. Assumed to be eight inches
Riser Pipe Material:	Stainless steel (Schedule unknown, likely Sch 5)
Riser Pipe Diameter:	2-inches
Well Screen Material:	Stainless steel
Well Screen Diameter:	2-inches
Depth of Well Screen:	21.5 feet bgs

2.1 DECOMMISSIONING PROCEDURES

1. Remove above ground protective casing from the monitoring well by excavating by hand around the well.

2. Check 2-inch diameter pipe for plumbness and alignment by lowering a 3 foot PVC dummy into the well. Note any areas of problems.

3. Set up drill rig over the well.

4. Over auger with 4 1/4 -inch inside diameter continuous flight augers. As this well is off the landfill and on private lands, the drill water and cuttings must be contained and transferred to the landfill.

5. Continue augering operation to 23 feet bgs, if possible. Remove all 2-inch diameter screen and riser pipe. **Note: if the augers cannot be kept straight during drilling go to contingency procedure.**

6. Remove augers and install tremie pipe into the borehole. Pump pure bentonite grout into the well to three feet below ground surface. Allow grout to set over night.

7. The following day top up the bentonite grout to three feet bgs, if required. Backfill the hole with soil to existing grade and cleanup the site.

3.0 CONTINGENCY PROCEDURES

1. If the augers go off line during coring operations attempt to return coring barrel/augers to a plumb alignment.

2. If this is not possible, cut the stainless steel pipe off at the depth of problem. (**Note: The minimum acceptable depth at which the 2-inch diameter pipe can be cutoff is 20 feet bgs.**) Remove coring equipment or augers and cutoff 2-inch diameter pipe.

3. Lower the tremie tube into the well and, if possible, into the 2-inch diameter pipe. Pump grout into the 2-inch diameter pipe and the borehole up to a depth of three feet bgs. Allow the grout to set overnight.

4. Complete the closure as specified in 6. above.

4.0 EQUIPMENT DECONTAMINATION

1. Move all down-hole equipment to the existing on-Site decontamination pad.

2. Clean all equipment with clean hot water under high pressure. Contain all decontamination water in the on-Site tanks.

5.0 WASTE MATERIAL HANDLING

1. As the well is off the landfill and on private lands, all drilling water must be contained and transferred to the on-Site tanks.

2. Drill cuttings can be used to backfill the upper three feet of the hole, with the remainder hauled back to the landfill for spreading at a place designated by CRA.

3. Contractor generated non-hazardous waste is to be removed by the Contractor.

BEDROCK CORE LOG

PROJECT NAME C.M.L. SITE
PROJECT NUMBER 3482
CLIENT C.M.L. SITE GROUP
LOCATION Cedartown, GA

DRILLING CONTRACTOR
DRILLER
BEDROCK SURFACE ELEV.
CORE SIZE
CORING METHOD

HOLE DESIGNATION OW-7
DATE STARTED 12-15-94
DATE COMPLETED 12-20-94
CRA SUPERVISOR J. SCHWALLER

DEPTH FROM	RUN No.	CORE RECOVERY %	RQD	DEPTH TO	GENERAL DESCRIPTION ROCK TYPE, COLOUR, TEXTURE, ETC. FORMATION: NEWALA	STRENGTH	WEATHERING	DISCONTINUITIES No. OF SETS	TYPE / S	ORIENTATION	SPACING	ROUGHNESS	APERATURE	FILLING	OCCASIONAL FEATURES (VUGS, ALTERATION PRODUCTS ETC.)	DRILLING OBSERVATIONS
12.8	1	88	75	16.8	LIMESTONE, dolomitic, light to medium gray, moderately to highly weathered, fine grained, highly fractured, calcite filled vugs + vertical fractures, 100% H_2O return											
16.8	2	0	0	26.8	NO RECOVERY: CLAY FILLED VOID. 0% H_2O Return.											
					NOTE: 6" Ø HOLE REAMED FROM 12.8' BGS TO 25' BGS.											
					12-21-94: WATER LEVEL 15' BGS.											

PROJECT NAME: [illegible]

PROJECT Nº: [illegible]

CLIENT: [illegible]

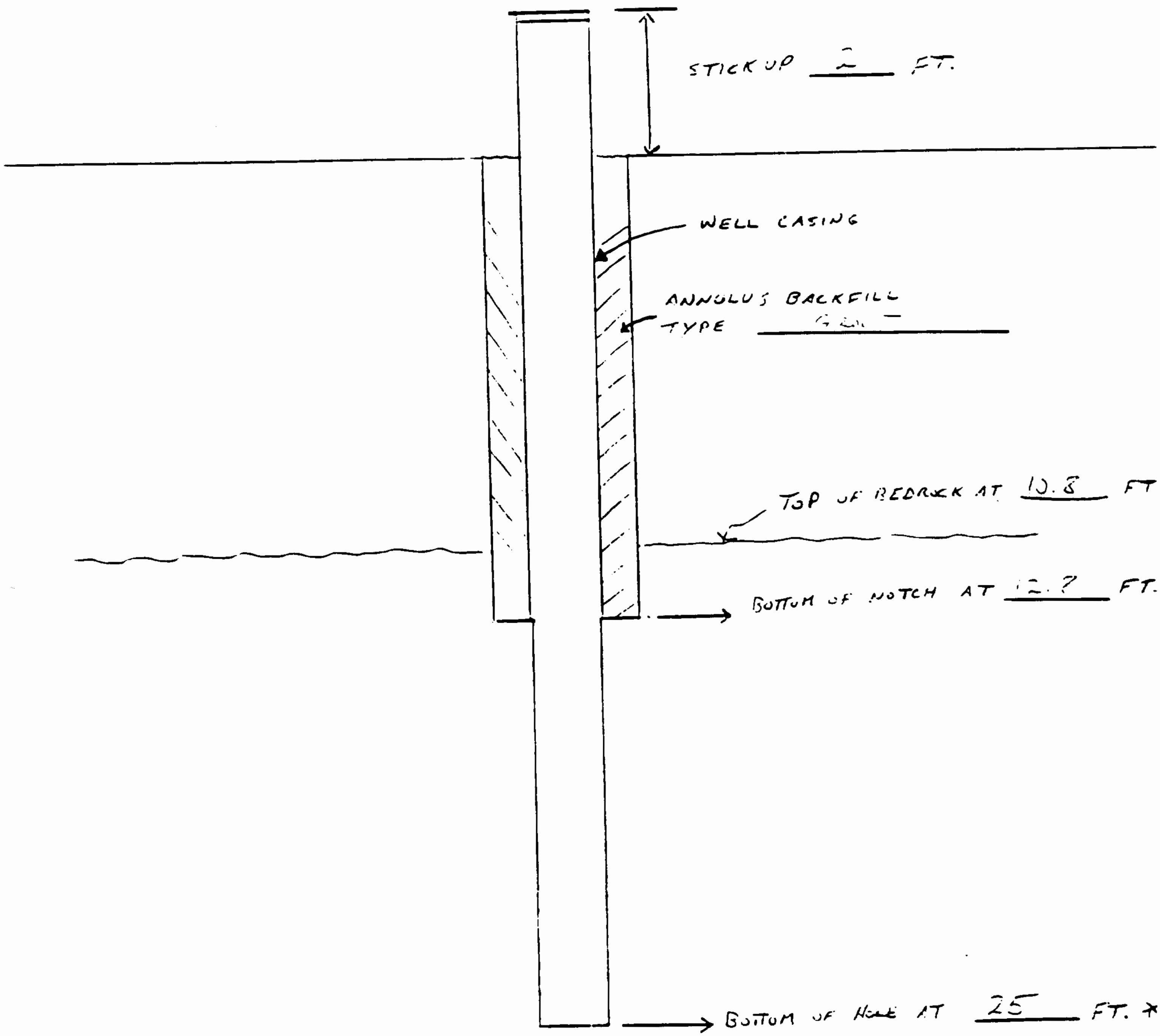
LOCATION: [illegible]

HOLE DESIGNATION: [illegible]

DATE COMPLETED: [illegible]

DRILLING METHOD: [illegible]

CRA SUPERVISOR: [illegible]



WELL CASING MATERIAL 6" Ø CARBON STEEL

WELL CASING DIAMETER 6" Ø

HOLE DIAMETER 6" Ø

DEVELOPMENT —

ATTACHMENT B

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Cedartown Mun Landfill
PROJECT NUMBER 3452
CLIENT C.M.L. Site Group
LOCATION Cedartown, GA.

DRILLING CONTRACTOR
DRILLER
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION OW1-7
DATE STARTED 12-19-94
DATE COMPLETED 12-20-94
DRILLING METHOD 6 1/4" ID HSA/6" ϕ wet rotary
CRA SUPERVISOR John Schwaller

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
3		10	CL - CLAY, silt, stiff, medium plasticity, no structure, light brown, moist, chert fragments, purple mottling, trace black color.	1SS	SS	3	5 (11)	6	5	3/5	0.		
				2SS	SS	2	4 (9)	5	7	8/10	0		
			END of HOLE @ 10.8' BGS										
			Note: 10" ϕ Notch to 12.8' BGS										

NOTES AND COMMENTS

CRA FORM SP-17

6. The following day top up the bentonite grout to three feet bgs, if required. Backfill the hole with soil to existing grade and cleanup the site.

3.0 CONTINGENCY PROCEDURES

1. If the core barrel or augers goes off line during coring operations attempt to return coring barrel/augers to a plumb alignment.

2. If this is not possible, cut the stainless steel pipe off at the depth of problem. (**Note: The minimum acceptable depth at which the 2-inch diameter pipe can be cutoff is 20 feet bgs.**) Remove coring equipment or augers and cutoff 2-inch diameter pipe.

3. Lower the tremie tube into the well and, if possible, into the 2-inch diameter pipe. Pump grout into the 2-inch diameter pipe and the borehole up to a depth of three feet bgs. Allow the grout to set overnight.

4. Complete the closure as specified in 6. above.

4.0 EQUIPMENT DECONTAMINATION

1. Move all down-hole equipment to the existing on-Site decontamination pad.

2. Clean all equipment with clean hot water under high pressure. Contain all decontamination water in the on-Site tanks.

5.0 WASTE MATERIAL HANDLING

1. All drilling water will be contained and transferred to the on-Site storage tanks pending approval for disposal at the City of Cedartown POTW.

2 Drill cuttings can be used to backfill the upper three feet of the hole, with the remainder spread on the surface of the landfill.

3. Contractor generate non-hazardous waste is to be removed by the Contractor.

3. Contractor generated non-hazardous waste is to be removed by the Contractor.

ATTACHMENT C

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

Rec'd. CRA
DEC 12 1994

December 8, 1994

4WD-SSRB

Mr. David D. Johnson
Cedartown City Manager
P.O. Box 65
Cedartown, GA 30125

RE: Cedartown Municipal Landfill Superfund Site, Cedartown, GA
Procedure for Disposal of Investigation Derived Waste (IDW)

Dear Mr. Johnson:

In a telephone conversation on December 8, 1994 with John Schwaller of Conestoga-Rovers, Associates, he discussed with me the disposal of IDW from the Cedartown Municipal Landfill site. The plan to dispose all cuttings from the decommissioning and installation of monitoring wells on site appears reasonable. Any free liquid which is recovered should be mixed with kiln dust or an equivalent substance before disposal. Section 4.5 of the Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual summarizes the protocols for handling IDW. These SOPs and any other applicable regulations must be followed. Please do not hesitate to call me at (404) 347-2643 extension 6250, if you have any questions.

Sincerely,

Annie M. Godfrey

Annie M. Godfrey
Remedial Project Manager
South Superfund Remedial Branch

cc: John Schwaller, CRA

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(404) 441-0027

MEMO

TO: David Johnson REFERENCE NO: 3482

FROM: John Schwaller DATE: February 14, 1995

RE: Construction Research
Decommissioned Monitoring Well CL-08-WP
Cedartown Municipal Landfill Site - Cedartown, Georgia

Conestoga-Rovers & Associates (CRA)was requested by the Technical Committee to further investigate the construction methods for monitoring well CL-08-WP. This further investigation was required due to the fact that when the monitoring well was decommissioned in December 1994, the 2-inch diameter riser pipe could not be overcored to the minimum depth specified in the decommissioning procedures. Instead, the 2-inch diameter well was filled with bentonite grout. The focus of the additional research was to determine if the 8-inch diameter surface casing and the 2-inch diameter riser pipe were pressure grouted at the time of construction. If this was the case, then the decommissioned CL-08-WP monitoring well would not be a potential pathway of contaminant migration from the landfill. The following memorandum presents the results of the further research.

CRA initially reviewed our files with respect to CL-08-WP. CRA only had the stratigraphic and instrumentation log for the well. The stratigraphic and instrumentation log did not specify the method of grout placement. Therefore, CRA contacted the following individuals to attempt to obtain actual documentation of the grout placement methods:

i) Mr. Michael Talbot - Drilling Manager: Law Engineering, Inc.;

ii) Ms. Priscilla Fritsch - Engineer: NUS/Halliburton Corporation; and

iii) Ms. Annie Godfrey - CML Site Project Manager: USEPA Region IV.

Inquiries at Law Engineering, Inc. (Law) with Mr. Talbot, revealed that no documents or staff involved with the installation of monitoring well CL-08-WP were in Law's possession.

CRA contacted NUS/Halliburton Corp., the primary contractor overseeing the initial CML Site investigation in 1987. The writer spoke with Ms. Priscilla Fritsch who was an engineer with NUS/Halliburton at the time of the monitoring well installation in 1987. Ms. Fritsch informed the writer that in 1987 NUS/Halliburton was under a Field Investigation Team (FIT) contract with the USEPA and that contract terminated in 1991. At that time, all documents related to projects under the FIT contract were forwarded to USEPA. However, Ms. Fritsch indicated that since NUS/Halliburton was under contract to perform USEPA field work, all field work would have been performed using USEPA Region IV standard operating protocols (SOP's). These SOP's specified tremie grouting. Ms. Fritsch suggested the writer undertake a file search at the USEPA.

The writer then contacted Ms. Annie Godfrey and requested she look into the matter as these records are much easily accessible to USEPA personnel. Ms. Godfrey agreed and on February 13, 1995 CRA received via facsimile the NUS well record, draft stratigraphic/instrumentation log, and Law Engineering Inc. log of time and materials for the construction and installation of monitoring well CL-08-WP. These documents are presented in Attachment A.

Upon review of these documents it was found that both the 8-inch diameter surface casing and the 2-inch diameter well were pressure grouted. With this information, CRA is comfortable that all potential conduits of contaminant migration to bedrock are sealed off, and that monitoring well CL-08-WP decommissioning procedures conducted by CRA on December 15, 1994 were appropriate and satisfactory.

Should you have any questions please contact the writer at your convenience.

3482/JS/8

c.c. Hadley Bedbury
Gordon Tate
Holly Kline
Michael Mateyk

FILE COPY

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(404) 441-0027

MEMO

TO: Gordon Tate
Hadley Bedbury

REFERENCE NO: 3482

FROM: John Schwaller

DATE: February 28, 1995

RE: Former Monitoring Well CL-08-WP
Cedartown Municipal Landfill Site - Cedartown, Georgia

During our telephone conversation of February 22, 1995, it was noted that Maxus had identified that the log of time and materials, documented by Law Engineering, Inc. (Law) during the construction of monitoring well CL-08-WP, did not accurately reflect the amount of grout needed to properly seal the monitoring well or surface casing. Therefore, pursuant to your request, CRA has again reviewed the documents provided by USEPA and described in a memo dated February 14, 1995 (Schwaller to Johnson). The following memorandum further explains CRA's position on the construction techniques utilized by Law during the grouting procedure of former monitoring well CL-08-WP.

CRA acknowledges the fact that the log of time and materials documented by Law does not correspond to the amount of grout needed to properly seal the 2-inch diameter stainless steel well material nor the 8-inch diameter surface casing. However, it is documented by NUS/Halliburton that pressure grouting was the method used to grout both the 2-inch diameter well material and the 8-inch diameter surface casing. The fact that CRA observed grout at the surface in both the annulus surrounding the 2-inch diameter well material and the 8-inch diameter surface casing supports this documentation and provides CRA with a certain level of comfort that the monitoring well was properly grouted at the time of construction.

Again, CRA realizes that the documentation of time and materials does not fully support the construction of former monitoring well CL-08-WP. However, it is CRA's experience that time and material logs documented by drilling firms are not exact and cannot be solely relied upon for construction documentation.

In summation, CRA is confident that any potential conduits of contaminant migration to the bedrock have been sealed off for the following reasons:

1) The 8-inch diameter surface casing was pressure grouted and grout was observed by CRA in the annulus.

2) The 2-inch diameter well was pressure grouted and grout was observed by CRA in the annulus between the 2-inch diameter well and the 8-inch diameter surface casing.

3) The interior of the former monitoring well was properly sealed off during the decommissioning activities of December 1994.

Should you have any questions please contact the writer at your convenience.

JS/bl/9

c.c. David Johnson
Holly Kline
Michael Mateyk

ATTACHMENT A

3482

NUS WELL RECORD

Project: Cedartown Landfill
Well No.: CLDR WP
Coordinates:
On-Site Geologist: [illegible]
Elevation (top of pipe):
Elevation (land surface):
Elevation (water table):
Date Measured:
Status of Well: Complete

DRILLING
Drilling Started: 5/12/87
Drilling Completed: 5/15/87
Drilling Company: Law Eng
Registration No.:
Permit No.:
Name of Driller: [illegible] Collins
Type of Rig: [illegible]
Drilling Fluid: [illegible] Mud

HOLE DATA
Hole Diameter: 10 in / 6 in
Thickness of Overburden:
Depth Drilled in Rock:
Total Depth of Hole: 106 ft

DEVELOPMENT
Method:
Rate of Flow:
Length of Time:

CASING
Type: SS Carbon Steel
Diameter: 2 in 8 in
Length: 95 ft 30 ft
Type of Joint: [illegible] flush coupled
Screen Slot: No. 10
Screen Length: 10 ft
Screen Setting: 92-102

GRAVEL
Type: Sand
Size: 20-40
Volume: 30 ft
Depth:

GROUT
Type: cement - bentonite
Method: pressure pressure
Volume:
Depth: 88-0 [illegible] 30-0 ft

BACKFILL
Type:

COMMENTS
Teflon wrapped SS casing joints
Surface casing installed

DRILLING LOG

Depth From	Depth To	Formation Description

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▸ 8

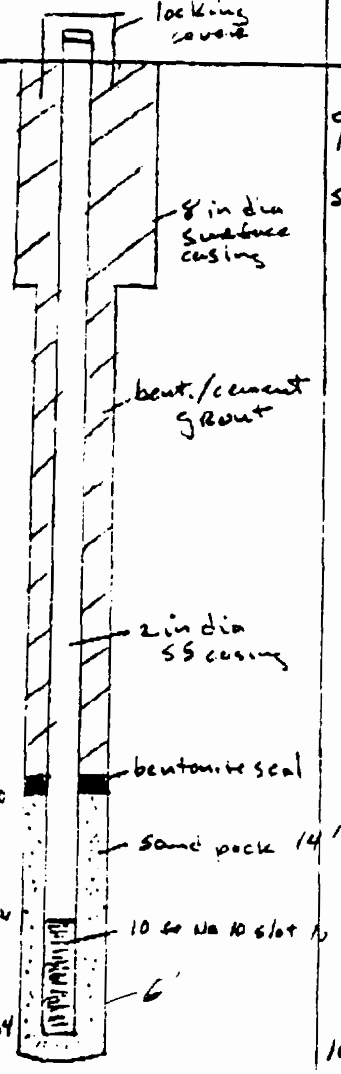
To John Schueller	From Annie Godfrey
Dept./Agency Conestoga Rovers	Phone # 347 2643 x 6250
Fax # 441-2050	Fax # 347-3058

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

NUS CORPORATION
A Halliburton Company

PROJECT Cedartown Landfill
PROJECT NO. F48703-26 BORING NO. SLOF WP DIAMETER
FIELD GEOLOGIST T. SHERROD DRILLING DATE 5-12-87, 5-15-87
SURFACE ELEVATION 854.5 STICK UP ELEVATION 856.21
DATE/STATIC WATER LEVEL 5-18-87 78 ft bls (776.5 elv)
SUBCONTRACTOR Law Eng. DRILLER H. Collins
DRILLING METHOD Mud Rotary SCALE: 1" = nts VERTICAL

LITHOLOGY SURFACE	PROFILE	DEPTH, FEET	SOIL SAMPLE NUMBER	PENETRATION (INCHES)	RECOVERY (INCHES)	DEPTH, FEET	BLOWS/6"	ROCK SAMPLE RUN	RECOVERY %	RQD %	WELL CONSTRUCTION DETAILS (NOT TO HORIZONTAL SCALE)	REMARKS
no topsoil		0										
clay: mottled, red-prpl, Kaolinitic		2										circulation loss in fill
clay and fill material to 20 ft												Surface casing to 30 ft bls
clay: red-brn, mottled streaky, sl sandy		20		1.5	1.4	20.5 22						
void space 44-52 ft												
clay: red-brn, as above												Void space 44-52 ft
shale: blk, sl. competent		73										
ironstone: red-brn, massive highly dissolved, voids common		94.5						104	57%	-	90	
		105 TD									94, 104	104 ft TD



Project: Colonial... Landfill
Project No: F9-8703-26 CL08 WP
Boring or Well No.: ~~CL08~~ ~~CL10 WP~~
Date: 5/13/87
Subcontractor: Law Eng

LOG OF TIME AND MATERIALS

Drilling

Hollow Stem Auger (D) w/sampling	
Hollow Stem Auger (D) w/o sampling	
6-in. Rotary (B)	30'
10-in. Rotary (B)	31

Materials

2-in dia. SS casing (ft.)	
2-in. dia. SS screen, (10 ft. section)	
2-in. dia. SS Screen, (15 ft. section)	
SS Top Caps	
8-in. dia. Carbon Steel Casing	30
Locking Protective Casing (each)	
Bentonite Pellets (bucket)	
Bentonite Powder (bag)	9
Portland Cement (bag)	12
Ready-mix Cement (bag)	
Sand (Ft^3 or bag)	

Time

Well Construction (D) (hr)	
Well Construction (B) (hr)	
Double Casing Installaiton (B) (hr)	2
Well Development (D) (hr)	(5730) 2.75
Well Development (B) (hr)	
Decontamination (hr)	2
Drilling Waste Control (hr)	

Project:
Project No:
Boring or Well No.:
Date:
Subcontractor:
Page Two

LOG OF TIME AND MATERIALS

Sampling

Shelby Tubes (each) ____________

Split Spoon Samples (each) ____________

Misceilaneous

Core Run (FT) 10

____________ (____) ____________

NUS Representative: ____________

Subcontractor's Representative: Hezzi Callen

Project: Cedartown Landfill
Project No: F4 8703-26
Boring or Well No.: CL 08 WP
Date: 5/14/87
Subcontractor: Law Eng.

LOG OF TIME AND MATERIALS

Drilling	
Hollow Stem Auger (D) w/sampling	
Hollow Stem Auger (D) w/o sampling	
6-in. Rotary ~~(B)~~ D	94.5 ~~63.5~~ ft
10-in. Rotary (B)	
Materials	
2-in dia. SS casing (ft.)	
2-in. dia. SS screen, (10 ft. section)	
2-in. dia. SS Screen, (15 ft. section)	
SS Top Caps	
8-in. dia. Carbon Steel Casing	
Locking Protective Casing (each)	
Bentonite Pellets (bucket)	
Bentonite Powder (bag)	5 [illegible]
Portland Cement (bag)	
Ready-mix Cement (bag)	
Sand (Ft^3 or bag)	
Time	
Well Construction (D) (hr)	5
Well Construction (B) (hr)	
Double Casing Installaiton (B) (hr)	
Well Development (D) (hr)	
Well Development (B) (hr)	
Decontamination (hr)	0.5
Drilling Waste Control (hr)	

Project:
Project No:
Boring or Well No.:
Date:
Subcontractor:
Page Two

LOG OF TIME AND MATERIALS

Sampling

Shelby Tubes (each) ____________

Split Spoon Samples (each) ____________

Miscellaneous

____________ (______) ____________

____________ (______) ____________

NUS Representative: ____________

Subcontractor's Representative: Haggai Collins

Project:
Project No:
Boring or Well No.:
Date:
Subcontractor:
Page Two

LOG OF TIME AND MATERIALS

Sampling

Shelby Tubes (each) 2

Split Spoon Samples (each) a

Miscellaneous

________ (____) ________

________ (____) ________

NUS Representative: ________

Subcontractor's Representative: Dizzi Collins

C

APPENDIX C

FINAL CONSTRUCTION REPORT

FILE COPY

CONESTOGA-ROVERS & ASSOCIATES
1351 Oakbrook Drive, Suite 150
Norcross, Georgia 30093
(404) 441-0027 Fax (404) 441-2050

February 2, 1995

Reference No. 3482

Ms. Annie Godfrey
Remedial Project Manager
South Superfund Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

Dear Ms. Godfrey:

Re: Final Construction Report
Cedartown Municipal Landfill Site - Cedartown, Georgia

INTRODUCTION

In accordance with the approved Remedial Action/Remedial Design (RD/RA) Work Plan for the Cedartown Municipal Landfill (CML) Site, one upgradient monitoring well (OW-7R) was installed. This monitoring well replaces the non-yielding monitoring well OW-7 which was decommissioned in conjunction with the installation of the replacement well. These activities were performed by Richard Simmons Drilling Co., Inc. and were conducted between the dates January 17 - 20, 1995. The final construction activities including development and surveying were completed on January 23, 1995. This letter report details the above activities.

This report was not included in the approved RD/RA Work Plan. However, the content and schedule for the Final Construction Report were established in a letter dated December 4, 1994 (Mateyk to Godfrey) and an extension to the submittal date approved in a letter dated January 19, 1995 (Godfrey to Johnson).

UPGRADIENT MONITORING WELL INSTALLATION

The upgradient monitoring well location, OW-7R, is located approximately 625 feet east of Tenth Street and approximately 45 feet north of Prior Station Road. This monitoring well was required to replace the original upgradient monitoring well OW-7 which was found to be non-yielding on January 4, 1995. The upgradient monitoring well location was moved in an attempt to locate competent water bearing bedrock.

Monitoring well OW-7R was installed utilizing 6-1/4 inch inside diameter (10-inch outside diameter) hollow-stem augers to bore through the overburden. Soil samples for geologic record were collected at 5-foot intervals until auger refusal in order to describe and classify the soil. The soil samples were classified using the Unified Soil Classification System (USCS) and will be stored at the City for a period of one year. Although the soil samples were screened for the presence of volatile organic contamination using an organic vapor analyzer, no values above background were detected. All soil cuttings were temporarily placed on polyethylene sheeting and then transported to the landfill.

Upon auger refusal, the hollow stem augers were removed from the borehole. The borehole was then reamed to 10 inches in diameter using a tricone bit and air-rotary drilling methods. The 10-inch diameter hole was advanced three feet into competent bedrock. Steel casing six inches in diameter was installed in the borehole where it was grouted in place from the bottom up using a tremie pipe placed at the bottom of the borehole. Grout was continually pumped until undiluted grout returned to the surface. At this time, the casing was pushed into the bedrock notch to further seal the annulus. With prior approval from USEPA field personnel, the grout was allowed to cure for a minimum of 16 hours prior to any coring activity.

All coring was performed in accordance with ASTM-D2113-83 using clean potable water as the circulation medium. The core hole was advanced using an "N" sized core barrel (1.88-inch diameter core and 2.98-inch hole). Due to the karst nature of the geology in the Cedartown area, only four feet of bedrock was encountered prior to penetrating a clay-filled cavern.

The core run was retrieved, laid in a core box and visually inspected by a geologist. The core was logged noting fractures, aperture size, orientation, spacing, filling, roughness and discontinuity type. Rock quality designations, water loss and gains, and any staining or secondary mineralization within the fractures were also noted. The core box was labeled indicating job name, job number, hole number, run number, run interval and date. The core box was stored in the on-Site warehouse and will remain there for a period of one year.

Upon completing the bedrock coring, the core hole was reamed to six inches in diameter to a target depth of 104 feet BGS using wet rotary techniques. The drilling fluid was circulated to remove rock cuttings from the borehole and containerized.

USEPA requested that the monitoring well be completed with a 2-inch diameter stainless steel screen and riser rather than as an open hole. Prior to any installation of well material, an attempt to determine the yield of monitoring well OW-7R was made. A 3-inch diameter stainless steel air-lift pump extracted approximately 150 gallons of very turbid groundwater. The well recovered sufficiently and the total depth of the borehole was now approximately 88 feet BGS. It was then determined that the hole would be water bearing and to install stainless steel well material.

A 10-foot length of 2-inch diameter stainless steel (#10 slot) well screen and thread coupled to Schedule 10 stainless steel riser pipe was installed in the borehole to a depth of 82 feet BGS. A 20 mesh graded silica sand pack was placed beneath and around the well screen which extended from the bottom of the borehole to a depth of 62 feet BGS. Above the sand pack, a 7-foot thick bentonite plug was installed and allowed to hydrate for approximately one hour prior to tremie grouting the remaining annular space.

The monitoring well was completed with a locking protective cap and a concrete pad.

The stratigraphic and instrumentation log for this monitoring well is provided in Attachment A.

Development of monitoring well OW-7R consisted of bailing and surging the screened interval with a stainless steel bailer and new nylon rope. A total of 50 gallons of groundwater was removed. Water quality remained turbid exhibiting greater than 200 nephelometric units (NTUs). The clarity however did improve over the course of development. Water quality is expected to improve over time as the groundwater passes through the monitoring well. A summary of groundwater purge data is presented in Table 1.

Monitoring well OW-7R was surveyed by Georgia Registered Land Surveyor, Mr. Vann Angel of Cedartown, Georgia on January 20, 1995. The reference point where all groundwater measurements will be taken is at an elevation of 809.3 feet above mean sea level.

Monitoring well completion details for all monitoring wells included in the groundwater monitoring network is presented in Table 2.

DECOMMISSIONING OF MONITORING WELL OW-7

Monitoring well OW-7 was decommissioned in conjunction with the construction of monitoring well OW-7R. Monitoring well OW-7, constructed as an open hole, was sounded and found to have collapsed to a depth of 19 feet below ground surface (bgs).

The concrete pad was removed and the casing cut off two feet below grade. The borehole was then grouted from the bottom up using the tremie method. The area surrounding the borehole was restored to original condition.

WASTE MATERIAL HANDLING

All soil was transported to the landfill and spread on Site as approved by USEPA in a letter dated December 8, 1994 (Godfrey to Johnson). All drilling water and waste water was temporarily stored in the on Site storage tanks pending disposal at the City of Cedartown POTW.

If you have any questions or require any additional information, please contact the writer at your convenience.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

John Schwaller

JS/kt/8

c.c. Madeline Kellam - GAEPD
David Johnson - City of Cedartown
Hadley Bedbury - Maxus
Gordon Tate - Superior Consultants
Holly Kline - Alston & Bird
Michael Mateyk - CRA

TABLE 1

WELL DEVELOPMENT DATA SUMMARY
ROUND ONE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Well Number	*Water Level (FT.BTOC)(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (μs/cm)(2)*	*Temperature (°F)(3)*	*Turbidity (NTUs)(4)*	*Method*
OW-7R	784.48	9.5	1	10	8.40	380	66.3	>200	Stainless Steel Bailer
			2	20	8.60	520	64.2	>200	
			3	30	7.90	400	63.5	>200	
			4	40	7.60	250	62.1	>200	
			5	50	7.10	150	60.1	>200	

Notes:

(1) Feet below top of casing.
(2) Micromhos per centimeter.
(3) Degrees Fahrenheit.
(4) Nephelometric units.

TABLE 2

CONSTRUCTION DETAILS FOR MONITORING WELL NETWORK
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Well Number	*Ground Elevation (Ft. AMSL((1)*	*Top of Well Elevation (Ft. AMSL)*	*Screened Interval*		*Bottom of Well*		*Screened Interval Lithologic Material*
			Elevation (Ft. AMSL)	*Depth (Ft. BGS)*	*Elevation (Ft. AMSL)*	*Depth (Ft. BGS)*	
OW-1	820.79	823.80	761.79-771.79	49.0-59.0	760.79	60.0	Dolostone
~~OW-1~~ OW-2	824.45	827.50	767.45-782.45	42.0-57.0	764.45	60.0	Dolostone
OW-3	801.50	803.29	Open Hole		608.50	193.0 (3)	Limestone
OW-4	799.00	801.52	739.0-749.0	50.0-60.0	730.00	69.0	Limestone
OW-5	795.42	797.92	712.42-732.42	63.0-83.0	710.42	85.0	Limestone
OW-6B	804.12	805.12	Open Hole		696.12	108.0 (4)	Limestone
OW-7R	806.70	809.30	724.70-734.70	72.0-82.0	724.70	88.0	Siderite
CL-03-WP (5)	833.60	836.41	736.1-751.1	82.5-97.5	735.60	98.0	Clay/limestone
CL-04-WP (5)	796.81	796.81	755.31-765.31	31.5-41.5	754.81	42.0	Limestone
CL-05-WP (5)	850.10	853.34	733.6-743.6	106.5-116.5	733.10	117.0	Limestone
CL-06-WP (5)	857.40	861.02	770.4-780.4	77.0-87.0	769.90	87.5	Limestone

TABLE 2

CONSTRUCTION DETAILS FOR MONITORING WELL NETWORK
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Well Number	*Ground Elevation (Ft. AMSL((1)*	*Top of Well Elevation (Ft. AMSL)*	*Screened Interval*		*Bottom of Well*		*Screened Interval Lithologic Material*
			Elevation (Ft. AMSL)	*Depth (Ft. BGS)*	*Elevation (Ft. AMSL)*	*Depth (Ft. BGS)*	
CL-07-WP (5)	823.30	824.90	793.3-803.3	20.0-30.0	792.80	30.5	Limestone
CL-09-WP (5)	802.40	803.63	770.9-780.9	21.5-31.5	770.40	32.0	Limestone

Notes:

(1) AMSL - above mean sea level
(2) BGS - below ground surface
(3) Well has since collapsed to 646.50 Ft. AMSL or 155 Ft. BGS.
(4) Well has since collapsed to 752.12 Ft. AMSL or 52.0 Ft. BGS.
(5) Source: NUS Corporation

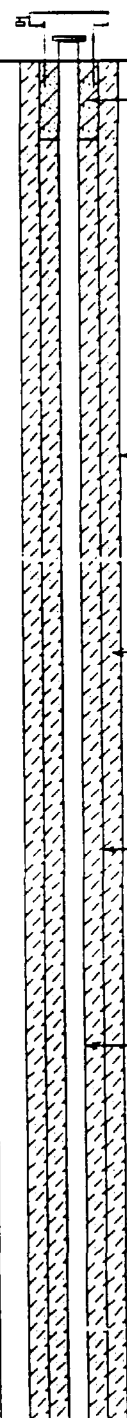
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NUMBER: 3482
CLIENT: CEDARTOWN MUNICIPAL LANDFILL SITE GROUP
LOCATION: CEDARTOWN, GA

HOLE DESIGNATION: OW-7R
DATE COMPLETED: JANUARY 19, 1995
DRILLING METHOD: 6 ¼" ID HSA
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
	REFERENCE POINT (Top of Riser)	809.30				
	GROUND SURFACE	808.70				
	[illegible] some silt, stiff to very stiff, [illegible] plasticity, poor to well structured, yellowish orange to light brown red, dry to moist, noncohesive		1SS		15	0
2.5						
5.0						
7.5			2SS		10	[illegible]
	- [illegible]					
10.0						
12.5			3SS		14	0
15.0						
17.5	- fine sand seam		4SS		10	0
20.0						
22.5			5SS		[illegible]	0
25.0						
	- greater cohesion, red mottling, light purple and gray mottling, increased moisture content, [illegible]erite pieces					
27.5			6SS		19	0
30.0						
32.5			7SS		15	0

MONITOR INSTALLATION



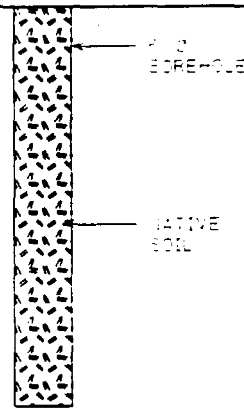
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊻ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NUMBER: 3482
CLIENT: CEDARTOWN MUNICIPAL LANDFILL SITE GROUP
LOCATION: CEDARTOWN, GA

HOLE DESIGNATION: CW-7R
DATE COMPLETED: JANUARY 19, 1995
DRILLING METHOD: NX CORE/6" WET ROTARY
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	DESCRIPTION OF STRATA	ELEV. ft. AMSL	MONITOR INSTALLATION	BEDROCK INTERVAL	RUN NUMBER	CORE RECOVERY %	RQD %	WATER RETURN %
96.5								
99.0								
101.5								
104.0	END OF HOLE @ 104 ft BGS							
106.5								
109.0								
111.5								
114.0								
116.5								
119.0								
121.5								
124.0								
126.5								



SCREEN DETAILS
Screened Interval:
[illegible] to 62 ft BGS
Length: [illegible] ft
Diameter: [illegible]
Slot Size: # [illegible]
Material: Stainless Steel
Sand Pack:
[illegible] to 68 ft BGS
Material: No. [illegible] Sand

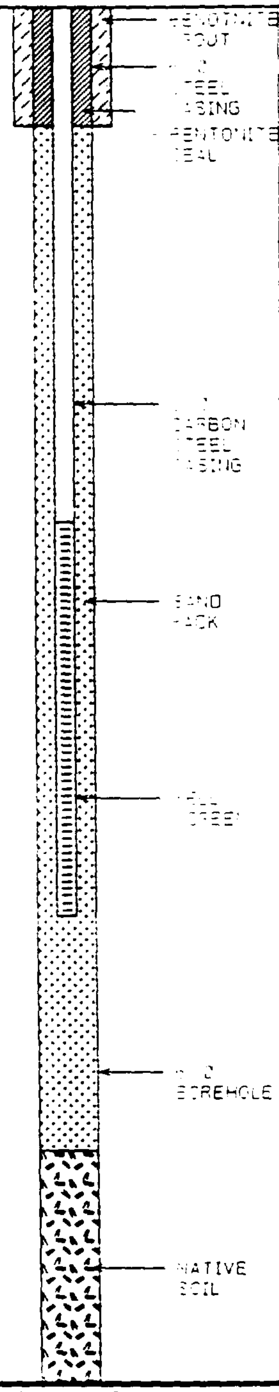
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NUMBER: 3482
CLIENT: CEDARTOWN MUNICIPAL LANDFILL SITE GROUP
LOCATION: CEDARTOWN, GA

HOLE DESIGNATION: CW-7R
DATE COMPLETED: JANUARY 19, 1995
DRILLING METHOD: NX CORE/6" WET ROTARY
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	DESCRIPTION OF STRATA	ELEV. ft. AMSL	MONITOR INSTALLATION	BEDROCK INTERVAL	RUN NUMBER	CORE RECOVERY %	RQD %	WATER RETURN %
	Overburden							
-61.5								
-64.0								
-66.5	[illegible] ft BGS							
-69.0								
-71.5								
-74.0								
-76.5	[illegible] weathered, [illegible]ered [illegible] ft BGS							
-79.0								
-81.5								
-84.0								
-86.5								
-89.0								
-91.5								



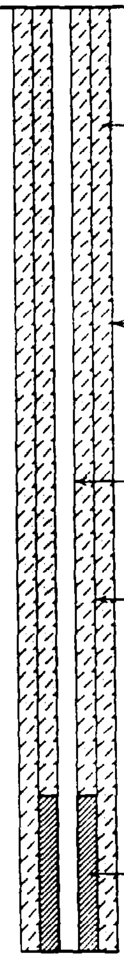
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NUMBER: 3482
CLIENT: CEDARTOWN MUNICIPAL LANDFILL SITE GROUP
LOCATION: CEDARTOWN, GA

HOLE DESIGNATION: OW-7R
DATE COMPLETED: JANUARY 19, 1995
DRILLING METHOD: 6 ¼" ID HSA
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
37.5			BENTONITE GROUT	8SS		17	0
40.0							
42.5			BOREHOLE	9SS		8	-
45.0							
47.5			CARBON STEEL PIPE	10SS		13	0
50.0			STEEL CASING				
52.5				11SS		>50	0
55.0							
57.5			BENTONITE SEAL	12SS		>50	-
	END OF OVERBURDEN HOLE @ 59 ft BGS	[illegible]					
60.0							
62.5							
65.0							
67.5							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

D

APPENDIX D

MONITORING WELL OW-3 MODIFICATIONS

FILE COPY

CONESTOGA-ROVERS & ASSOCIATES
1351 Oakbrook Drive, Suite 150
Norcross, Georgia 30093
(404) 441-0027 Fax: (404) 441-2050

September 21, 1995

Reference No. 3482

Ms. Annie Godfrey
Remedial Project Manager
South Superfund Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30365

Dear Ms. Godfrey:

Re: Completion of Monitoring Well OW-3
with Stainless Steel Well Material
Cedartown Municipal Landfill Site
Cedartown, Georgia

Further to the Group's direction, Conestoga-Rovers & Associates (CRA) has been investigating the cause for the anomalously high manganese concentration occurring in perimeter monitoring well OW-3. The groundwater analytical data from groundwater samples collected from monitoring well OW-3 during Round Two and Three of the Quarterly Groundwater Sampling Events exhibited 4.89 mg/L and 1.16 mg/L of manganese, respectively. These high concentrations were not detected during the Remedial Investigation (RI) conducted in 1991 nor were they detected in the first sampling event (January 1995) conducted during the RA. Based on this investigation, it is CRA's opinion that the present construction of monitoring well OW-3 may be suspect.

Perimeter monitoring well OW-3 was originally constructed as an open borehole monitoring well during the RI. Monitoring well OW-3 was constructed as an open borehole monitoring well because at the time of construction, CRA did not feel comfortable that construction of a stainless steel well would be possible within the cavernous clay filled voids indicative of the karst geology encountered. Although the groundwater yield has not significantly diminished, this monitoring well has collapsed since its' construction in 1991 from its' original depth of 193 feet below ground surface (bgs) to approximately 155 feet bgs. Because the groundwater is now in direct contact with the carbon steel surface casing, it is becoming increasingly difficult to achieve low levels of turbidity (< 10 NTUs) due to the degradation of the carbon steel casing. The degradation of the steel casing is producing rust particles and recently observed iron-reducing bacteria growth which can not be removed or diminished through additional purging or reduced flow.

Upgradient monitoring well OW-7R was constructed during the Remedial Design (RD) with stainless steel well material in the same geologic conditions as monitoring well OW-3, and has been a successful completion. Therefore, CRA has recommended to the Group that stainless steel well material be installed in monitoring well OW-3. The installation of stainless steel well material is recommended to prevent any contact with the steel casing and thereby obtain representative groundwater samples.

On September 13, 1995 CRA was granted permission by the Group to initiate steps to complete monitoring well OW-3 with stainless steel well material. Based on your verbal approval of September 18, 1995, CRA has tentatively scheduled the construction for the week of October 16, 1995. Construction is anticipated to be completed in approximately four days. Upon review, please direct written approval to Mr. David Johnson, City Manager of Cedartown.

Should you have any questions, please feel free to contact me at (770) 441-0027.

Yours truly,

CONESTOGA - ROVERS & ASSOCIATES

John O. Schwaller

JS/kt/21

c.c. Hadley Bedbury - Maxus
Gordon Tate - Superior Consultants
Mike Mateyk - CRA

CONESTOGA-ROVERS & ASSOCIATES
1351 Oakbrook Drive, Suite 150
Norcross, Georgia 30093
(404) 441-0027 Fax: (404) 441-2050

October 6, 1995

Reference No. 3482

Ms. Annie Godfrey
Remedial Project Manager
South Superfund Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

Dear Ms. Godfrey:

Re: Perimeter Monitoring Well OW-3 Retrofit Construction
Cedartown Municipal Landfill Site
Cedartown, Georgia

Pursuant to your request, please find the enclosed figure of the proposed retrofit construction of perimeter monitoring well OW-3 located at the above referenced site. Construction of this monitoring well is scheduled for October 16, 1995 as discussed with you previously.

We trust that this figure meets your needs; however, should you have any additional questions please feel free to contact me at (770) 441-0027.

Yours truly,

CONESTOGA - ROVERS & ASSOCIATES

Kristen Sline for

John O. Schwaller

Encl.

JS/kt/23

c.c. David Johnson - City of Cedartown
Hadley Bedbury - Maxus
Gordon Tate - Superior Consultants
Mike Mateyk - CRA

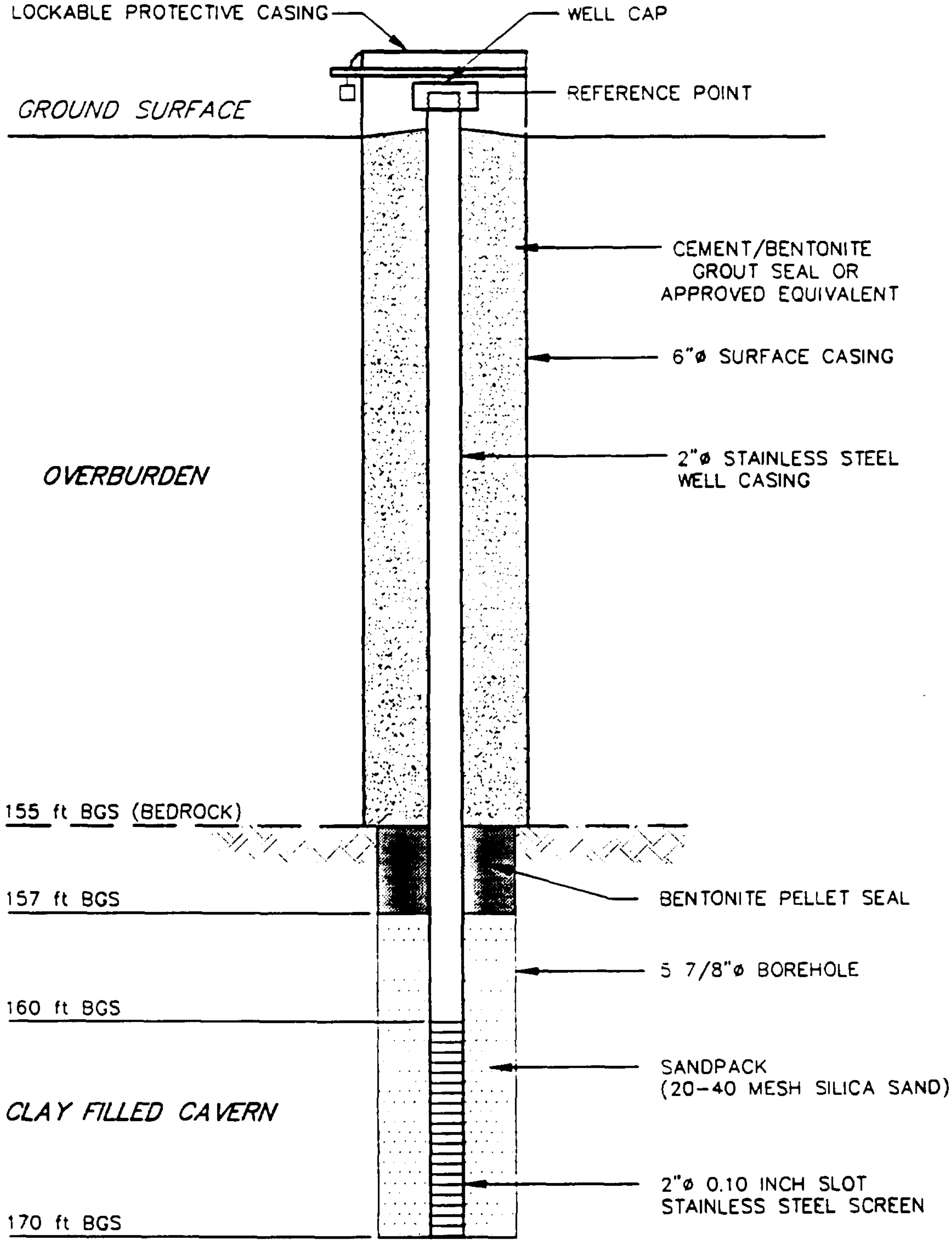


figure 1

PROPOSED OW3 WELL CONSTRUCTION
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (1) OCT 11/95(A) REV.0 (D-01)

APPENDIX E

SEMI-ANNUAL INSPECTION LOGS

SEMIANNUAL INSPECTION LOG
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Inspector's Name/Title	David Johnson/City Manager	
Date of Inspection	February 10, 1995	(month/day/year)
Time of Inspection	1330 hours to 1745 hours	(military time)
Weather Conditions	Clear - Windy - 67 °F	(i.e., Temp. °F, precipitation)

Activity	*Items*	*Condition/ Status*	*Observations/Comments* [1]	*Corrective Action Taken*
Landfill Cover	• Vegetative Cover	Good		NA
	• Evidence of Erosion	None		NA
	• Evidence of Subsidence	None		NA
	• Evidence of Exposed Refuse	None	Surficial refuse only	NA
	• Access Controlled	Yes		NA
Seep Inspection	• Condition of East Seep	Unchanged		NA
	• Evidence of New Uncontrolled Discharge of Leachate	None		NA
	• Evidence of New Surface Staining	None		NA

[1] Note areas of concern on attached figure.

3482/Godfrey/9/Inspection Log

SEMIANNUAL INSPECTION LOG
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Inspector's Name/Title	David Johnson/City Manager	
Date of Inspection	November 21, 1995	(month, day, year)
Time of Inspection	1400 hours to 1730 hours	(military time)
Weather Conditions	Clear - 59 deg. F	(i.e., Temp deg. F, precipitation)

Activity	*Items*	*Conditional Status*	*Observations/Comments (1)*	*Corrective Action Taken*
Landfill Cover	Vegetative Cover	Good		NA
	Evidence of Erosion	None		NA
	Evidence of Subsidence	None		NA
	Evidence of Exposed Refuse	None	Surficial refuse only	NA
	Access Controlled	Yes		NA
Seep Inspection	Condition of East Seep	Unchanged		NA
	Evidence of New Uncontrolled Discharge of Leachate	None		NA
		None		NA
	Evidence of New Surface Staining			NA

Notes:

(1) Note areas of concern on attached figure.

3482-M-14-SIL

SEMIANNUAL INSPECTION LOG
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Inspector's Name/Title	John D. Johnson, City Manager	
Date of Inspection	March 19, 1996	(month/day/year)
Time of Inspection	0830 - 1200	(military time)
Weather Conditions	Cold, windy, 42° F, wet	(i.e., Temp. °F, precipitation)

Activity	*Items*	*Condition/ Status*	*Observations/Comments*	*Corrective Action Taken*
Landfill Cover	• Vegetative Cover	Good		
	• Evidence of Erosion	None		
	• Evidence of Subsidence	None		
	• Evidence of Exposed Refuse	Sporadic	(very old in nature)	(N/A)
	• Access Controlled	Yes		
Seep Inspection	• Condition of East Seep	Unchanged		
	• Evidence of New Uncontrolled Discharge of Leachate	None		
	• Evidence of New Surface Staining	None		

SEMIANNUAL INSPECTION LOG
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Inspector's Name/Title	J. David Johnson, City Manager	
Date of Inspection	10/11/96	(month/day/year)
Time of Inspection	1430 - 1745 hours	(military time)
Weather Conditions	Clear, Cool, and Dry; 73°	(i.e., Temperature °F, precipitation)

Activity	*Items*	*Condition/ Status*	*Observations/Comments*[1]	*Corrective Action Taken*
Landfill Cover	• Vegetative Cover	Good	Increased Growth	
	• Evidence of Erosion	None		
	• Evidence of Subsidence	None		
	• Evidence of Exposed Refuse	Sporadic		
	• Access Controlled	Yes		
Seep Inspection	• Condition of East Seep	Unchanged		
	• Evidence of New Uncontrolled Discharge of Leachate	None		
	• Evidence of New Surface Staining			

[1] Note areas of concern on attached figure.

3482Godf-9-SIL

SEMIANNUAL INSPECTION LOG
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Inspector's Name/Title	David Johnson, City Manager	
Date of Inspection	June 23, 1997	(month/day/year)
Time of Inspection	0800-1100	(military time)
Weather Conditions	clear, sunny, 86°F	(i.e., Temp.°F, precipitation)

Activity	*Items*	*Condition/ Status*	*Observations/Comments* [1]	*Corrective Action Taken*
Landfill Cover	• Vegetative Cover	Good	Increased growth	
	• Evidence of Erosion	None		
	• Evidence of Subsidence	None		
	• Evidence of Exposed Refuse	Sporadic		
	• Access Controlled	Yes		
Seep Inspection	• Condition of East Seep	Unchanged		
	• Evidence of New Uncontrolled Discharge of Leachate	None		
	• Evidence of New Surface Staining	None		

[1] Note areas of concern on attached figure.

3482John-3-Inspect.log

F

APPENDIX F

FIELD TECHNICAL MEMORANDA

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(404) 441-0027

MEMO

TO: Mike Mateyk

REFERENCE NO: 3482

FROM: John Schwaller

DATE: February 2, 1995

RE: Round One Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the first round of groundwater and surface water samples collected at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 13 of 13 monitoring wells (of all monitoring wells);
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
v) sampling 2 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods January 4 - 11 and January 23, 1995.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells sampled were located and in good condition. Due to the age and condition of the locks, a majority of them had to be cut in order to gain access to the wells. New locks were ordered and installed on the protective casings.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling the monitoring wells, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

With the exception of monitoring well OW-7R, all monitoring wells were purged prior to sampling using a low-flow purging technique. Monitoring well OW-7R could not be purged in this manner due to the excessive sedimentation of the well. This sedimentation is most likely due to the lithology in which this well had to be constructed. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells with the exception of monitoring wells OW-7R and CL-09-WP were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and polyethylene intake tubing. This pump was utilized due to the shallow depth of this monitoring well.

- Airlift Pump

Because of the large volumes of water needed to purge the larger 6-inch and 8-inch diameter monitoring wells (OW-3 and OW-6B), these wells were purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

- Stainless Steel Bailer

Because the water quality of monitoring well OW-7R was extremely turbid, a bladder pump could not be utilized in this location; therefore, a stainless steel bailer and new nylon rope was used to purge this monitoring well.

All polyethylene tubing used during purging was dedicated to the respective monitoring wells with the exception of monitoring well OW-6B.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, temperature, and turbidity were measured after each well volume, except where noted, to determine whether to terminate purging upon removal of three times the standing water volume or continue to a maximum of five times the volume. Calibration of field instruments were performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged, with the exception of monitoring well CL-07-WP, for the analysis of beryllium, cadmium, chromium, lead and manganese. A groundwater sample could not be collected from monitoring well CL-07-WP because it was purged dry and did not recover to a sufficient level. With the exception of the groundwater sample collected from monitoring well OW-7R, all groundwater samples collected exhibited a turbidity of less than

50 nephelometric units (NTUs). Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring wells OW-7R, CL-06-WP, and CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and polyethylene intake tubing in which the well was purged with.

- Teflon bailer

Groundwater samples were collected from monitoring wells OW-7R, CL-06-WP, and the larger diameter monitoring wells OW-3 and OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A summary of sample data and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, stainless steel bailer and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing with tap water, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/kt/7

c.c. David Brytowski

TABLE 2

WELL PURGING DATA SUMMARY
ROUND ONE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Well Number	*Water Level Elevation(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm)(2)*	*Temperature (°F)(3)*	*Turbidity (NTUs)(4)*	*Method*
OW-1	786.26	3.8	1	4	6.81	523	55	14	Bladder pump
			2	8	6.73	540	57	8	
			3	12	6.67	555	58	4	
OW-2	780.05	1.96	5	10	-	-	-	3.5	Bladder pump
OW-3	773.79	185	1	185	8.30	730	62.4		Airlift pump
			2	370	8.41	698	63.0		
			3	555	8.03	739	63.2		
			4	740	7.20	479	64.2		
			5	925	7.30	445	62.5	14.36	
OW-4	763.1	3.8	5	20	-	-	-	43	Bladder pump
OW-5	774.64	9.8	1	10	7.80	410	58	20.0	Bladder pump
			2	20	7.50	420	60	12.0	
			3	30	7.74	369	60	11.2	
OW-6B	785.35	83.8	5	420	-	-	-	47	Airlift pump

TABLE 2

WELL PURGING DATA SUMMARY
ROUND ONE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Well Number	*Water Level (FT.BTOC)(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µs/cm)(2)*	*Temperature (ºF)(3)*	*Turbidity (NTUs)(4)*	*Method*
OW-7R	784.48	9.5	1	10	8.40	380	66.3	>200	Stainless Steel Bailer (5)
			2	20	8.60	520	64.2	>200	
			3	30	7.90	400	63.5	>200	
			4	40	7.60	250	62.1	>200	
			5	50	7.10	150	60.1	>200	
CL-03-WP	786.54	8.4	1	8.5	7.49	290	61.8	30	Bladder pump
			2	17.0	7.20	290	61.0	25	
			3	25.5	7.13	270	59.7	23	
			4	34.0	7.14	275	59.4	21.6	
CL-04-WP	761.33	0.88	5	5	-		-	4.9	Bladder pump
CL-05-WP	780.22	7.0	1	7	8.02	590	61	30.6	Bladder pump
			2	14	7.91	584	60	22.4	
			3	21	7.67	577	59	23.8	
			4	28	7.55	572	58.3	19.38	
CL-06-WP	776.8	0.6	1	0.5	7.60	535	55.4	>200	Bladder pump
			2(6)	1.0	7.52	549	57.2	47	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND ONE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Well Number	*Water Level (FT.BTOC)(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µs/cm)(2)*	*Temperature (ÞF)(3)*	*Turbidity (NTUs)(4)*	*Method*
CL-07-WP	801.09	1.0	1(7)	1.5	7.03	829	63	>200	Bladder pump
CL-09-WP	788.74	2.8	1	3	7.25	630	63	19.0	Peristaltic pump
			2	6	7.20	550	62.5	13.0	
			3	9	7.12	531	61.5	12.5	

Notes:

- Parameters not measured due to faulty equipment.

(1) Feet above mean sea level.
(2) Micromhos per centimeter.
(3) Degrees fahrenheit.
(4) Nephelometric units.
(5) Stainless steel bailer was necessary due to extreme sedimentation.
(6) Well was purged dry after two volumes.
(7) Well was purged dry and did not recover.

TABLE 3

SAMPLE SUMMARY
ROUND ONE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Sample Number	*Source*	*Parameters*	*Turbidity*	*Method*	*Comments*
W-3482-JOS-010595-01	OW-2	(1)	3.5	(3)	
W-3482-JOS-010595-02	OW-6B	(1)	47	(4)	
W-3482-JOS-010695-03	CL-04-WP	(1)	4.9	(3)	
W-3482-JOS-010695-04	OW-4	(1)	43	(3)	W-3482-JOS-010695-05 (Duplicate)
W-3482-JOS-010695-06	OW-5	(1)	11.2	(3)	
W-3482-JOS-010695-07	CL-09-WP	(1)	12.5	(5)	
W-3482-JOS-010995-08	CL-03-WP	(1)	21.6	(3)	
W-3482-JOS-011095-09 MS/MSD	OW-1	(1)	4.0	(3)	Matrix Spike/Matrix Spike Duplicate
W-3482-JOS-011095-10	OW-3	(1)	14.36	(4)	
W-3482-JOS-011095-11	CL-05-WP	(1)	19.38	(3)	
W-3482-JOS-011195-12	Rinsate Blank	(1)	-	-	Rinsate of Bladder Pump
W-3482-JOS-011195-13	Coke Pond	(2)	-	-	Surface Water Grab Sample
W-3482-JOS-011195-14	CL-06-WP	(1)	47	(4)	
W-3482-JOS-012395-15	OW-7R	(1)	>200	(4)	

Notes:

(1) beryllium, cadmium, chromium, lead, manganese
(2) aluminum, chromium, copper, lead, nickel, zinc
(3) Teflon bailer/stainless steel body pump
(4) disposable Teflon bailer
(5) Peristaltic pump

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(404) 441-0027

MEMO

TO: Mike Mateyk REFERENCE NO: 3482

FROM: John Schwaller DATE: May 2, 1995

RE: Round Two Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the second round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

- i) well inspections;
- ii) water level measurements;
- iii) purging 13 of 13 monitoring wells (of all monitoring wells);
- iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
- v) sampling 3 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
- vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods April 24 through May 2, 1995.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling the monitoring wells, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the large volumes of water needed to purge the 6-inch and 8-inch diameter monitoring wells (OW-3 and OW-6B), these monitoring wells were purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene tubing used during purging was re-dedicated to the respective monitoring wells with the exception of monitoring well CL-09-WP in which the Teflon tubing was discarded due to age and poor condition.

Purging was conducted in accordance with the approved RD/RA Work Plan. Except where noted, field parameters of pH, conductivity, temperature, and turbidity were measured after each well volume. Purging continued until stabilization of pH, conductivity, and temperature had been achieved. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. With the exception of the groundwater samples collected from monitoring wells OW-6B, CL-06-WP, and CL-07-WP, all groundwater samples collected exhibited a turbidity of less than 50 NTUs. The turbidity was above 50 NTUs at monitoring well OW-6B due to an orange colored suspected iron algae growth, while monitoring wells CL-06-WP and CL-07-WP were purged dry resulting in the removal of sediment deposited in the bottom of the wells.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

Groundwater samples were collected from the larger diameter monitoring wells OW-3 and OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/kt/10

c.c. David Brytowski - CRA
Hadley Bedbury - Maxus Energy
Gordon Tate - Superior Consultants
David Johnson - City of Cedartown

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1995	*April 1995*	*July 1995*	*October 1995*
OW-1	823.80	786.26	787.35		
OW-2	827.50	780.05	779.81		
OW-3	803.29	773.79	779.08		
OW-4	801.52	763.10	764.98		
OW-5	797.92	774.64	776.58		
OW-6B	805.12	785.35	791.00		
OW-7R	809.30	784.48	788.75		
CL-03-WP	836.41	786.54	791.47		
CL-04-WP	796.81	761.33	764.30		
CL-05-WP	853.34	780.22	783.40		
CL-06-WP	861.02	776.80	773.38		
CL-07-WP	824.90	801.09	801.42		
CL-09-WP	803.18	788.74	794.96		

Notes:

(1) Elevations are feet above mean sea level.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
APRIL 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	787.35	4	1	4	--	--	--	--	Bladder pump
			2	8	6.9	535	66	12	
			3	12	6.7	560	67	10	
			4	16	6.7	573	66	18	
			5	20	6.8	599	68	11	
			6	24	6.9	588	69	7	
OW-2	779.81	2	1	2	--	--	--	--	Bladder pump
			2	4	7.1	821	63	10	
			3	6	6.9	671	66	4	
			4	8	6.9	685	65	2	
			5	10	6.9	680	66	2	
			6	12	6.9	708	68	2	
OW-3	779.08	192	1	200	12.3	1110	61	32	Purge pump
			2	400	6.8	501	71	130	
			3	600	6.4	484	75	260	
			4	800	6.2	484	72	74	
			5	1000	5.9	450	71	34	
OW-4	764.98	4	1	4	6.9	2420	71	12	Bladder pump
			2	8	6.8	1980	67	5	
			3	12	6.7	3990	69	3.4	
			4	16	6.9	4050	69	3.3	
			5	20	6.7	4090	67	7	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
APRIL 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-5	776.58	10	1	10	7.8	808	68	113	Bladder pump
			2	20	8.0	790	67	17	
			3	33	8.1	793	68	8.6	
OW-6B	791.00	99	1	100	--	--	--	--	Purge pump
			2	200	6.6	250	64	303	
			3	300	6.8	207	63	345	
			4	400	6.9	292	55	99	
			5	500	6.7	353	68	98	
			6	600	7.3	428	67	75	
			7	700	7.0	410	67	73 (5)	
OW-7R (6)	788.75	10	1	10	6.9	86	67	8	Bladder pump
			2	20	6.9	64	68	5	
			3	30	--	--	--	--	
			4	40	6.2	62	72	4.2	
			5	50	6.8	64	70	15	
			6	60	6.6	66	72	11	
			7	70	--	--	--	--	
			8	80	7.1	69	59	7	
			9	90	7.0	60	62	6	
			10	100	--	--	--	--	
			11	110	6.6	54	65	4	
			12	120	6.3	54	66	4.7	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
CL-03-WP	791.47	9	1	10	--	--	--	--	Bladder pump
			2	20	8.5	815	66	250	
			3	30	7.7	966	72	71	
			4	40	6.9	496	73	29	
			5	50	6.8	332	76	21	
			6	60	6.8	387	73	20	
CL-04-WP	764.30	1.4	1	2	6.8	262	62	28	Bladder pump
			2	4	6.5	320	66	25	
			3	6	6.5	256	66	9	
			4	8	6.7	293	63	33	
			5	11	7.2	210	63	4	
CL-05-WP	783.40	7.5	1	8	7.0	469	60	25	Bladder pump
			2	16	7.1	602	64	36	
			3	24	6.8	610	66	4.7	
			4	32	6.9	618	68	8	
CL-06-WP (7)	773.38	0.9	1	0.75	7.1	588	72	135	Bladder pump
CL-07-WP (8)	801.42	1.5	1	1.5	7.6	810	66	>1000	Bladder pump
CL-09-WP	794.96	3.9	1	4	7.1	389	72	19	Peristaltic pump
			2	8	6.7	338	73	8	
			3	12	6.3	356	76	10	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
APRIL 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain iron bacteria - like algae.
(6) Development of volumes 1-6 was conducted on 4/27/95. Purging of volumes 7-12 and sampling was conducted on 4/28/95.
(7) Well was purged dry after one volume on 4/27/95 and recovered sufficiently on 4/27/95 to collect a sample.
(8) Well was purged dry after one volume on 5/1/95 and recovered sufficiently on 5/2/95 to collect a sample.

TABLE 3

SAMPLE KEY/FIELD DATA
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1995

Sample Number	*Source*	*Turbidity (NTUs)*	*Parameters*	*Method*	*Comments*
GW-3482-JOS-042595-016	CL-01-WP	4	(1)	(2)	
GW-3482-JOS-042595-017	OW-6B	73	(1)	(3)	GW-3482-JOS-042595-018 (Duplicate)
GW-3482-JOS-042595-019	OW-4	7	(1)	(2)	
GW-3482-JOS-042595-020	OW-5	8.6	(1)	(2)	
GW-3482-JOS-042695-021	CL-03-WP	20	(1)	(2)	
GW-3482-JOS-042695-022	CL-09-WP	3	(1)	(4)	
GW-3482-JOS-042895-023	OW-7R	4.7	(1)	(2)	
GW-3482-JOS-042695-024	OW-3	34	(1)	(3)	
GW-3482-JOS-042795-025	OW-2	2	(1)	(2)	
GW-3482-JOS-042795-026	CL-06-WP	133	(1)	(2)	
GW-3482-JOS-042795-027	CL-05-WP	8	(1)	(2)	
GW-3482-JOS-050195-028 MS/MSD	OW-1	7	(1)	(2)	Matrix Spike/Matrix Spike Duplicate
GW-3482-JOS-050295-029	CL-07-WP	>1000	(1)	(2)	

TABLE 3

SAMPLE KEY/FIELD DATA
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1995

Sample Number	*Source*	*Turbidity (NTUs)*	*Parameters*	*Method*	*Comments*
SW-3482-JOS-042895-002	Coke Pond	--	(5)	--	Surface water grab sample
RB-1	Bladder pump	--	(1)	--	Rinsate blank prior to use in OW-1

Notes:

(1) Beryllium, cadmium, chromium, lead, manganese

(2) Bladder pump

(3) Disposable teflon bailer

(4) Peristaltic pump

(5) Aluminum, chromium, copper, lead, nickel, and zinc

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(770) 441-0027

MEMO

TO: Mike Mateyk

REFERENCE NO: 3482

FROM: John Schwaller

DATE: August 23, 1995

RE: Round Three Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the third round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 13 of 13 monitoring wells (of all monitoring wells);
iv) sampling 9 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
v) sampling 1 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods July 19 through July 24, 1995.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the large volumes of water needed to purge the 6-inch and 8-inch diameter monitoring wells (OW-3 and OW-6B), these monitoring wells were purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, temperature, and turbidity were measured after each well volume. Purging continued until stabilization of pH, conductivity, and temperature had been achieved. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. Although all groundwater samples collected exhibited a turbidity of less than 50 NTUs, it is becoming extremely difficult to achieve these levels in monitoring wells OW-3 and OW-6B due to the degradation of the carbon steel casing. This degradation is producing rust particles and iron algae growth which cannot be removed or diminished through additional pumping or reduced flow. The installation of stainless steel well material in these monitoring wells should be considered.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

Groundwater samples were collected from the larger diameter monitoring wells OW-3 and OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/kt/12

c.c. David Brytowski - CRA
Hadley Bedbury - Maxus Energy
Gordon Tate - Superior Consultants
David Johnson - City of Cedartown

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1995	*April 1995*	*July 1995*	*October 1995*
OW-1	823.80	786.26	787.35	778.35	
OW-2	827.50	780.05	779.81	772.92	
OW-3	803.29	773.79	779.08	764.97	
OW-4	801.52	763.10	764.98	759.17	
OW-5	797.92	774.64	776.58	773.42	
OW-6B	805.12	785.35	791.00	779.94	
OW-7R	809.30	784.48	788.75	783.52	
CL-03-WP	836.41	786.54	791.47	781.31	
CL-04-WP	796.81	761.33	764.30	756.59	
CL-05-WP	853.34	780.22	783.40	777.99	
CL-06-WP	861.02	776.80	773.38	-- (2)	
CL-07-WP	824.90	801.09	801.42	792.75	
CL-09-WP	803.18	788.74	794.96	785.03	

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND THREE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
JULY 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	778.35	2.5	1	3	6.9	572	67	95	Bladder pump
			2	6	6.8	575	67	36	
			3	10	6.7	580	67	9	
OW-2	772.92	1.0	1	1	6.9	850	71	17	Bladder pump
			2	2	7.1	815	70	7	
			3	3	6.9	815	70	8	
			4	4	6.9	815	70	7	
			5	5	6.9	810	70	7	
OW-3	764.97	171	1	175	6.8	523	64	36	Airlift pump
			2	350	7.0	594	64	160	
			3	525	7.9	430	64	330	
			4	700	8.1	275	64	68	
			5	875	8.4	257	64	25	
OW-4	759.17	3	1	3	7.2	2120	70	50	Bladder pump
			2	6	7.1	2400	69	25	
			3	10	7.1	2320	69	14	
OW-5	773.42	10	1	10	7.9	439	74	4	Bladder pump
			2	20	7.8	424	71	2	
			3	33	7.8	427	71	2	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND THREE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
JULY 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (μS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-6B	779.94	70	1	100	7.3	383	62	100	Airlift pump
			2	200	7.4	348	62	55	
			3	300	7.3	340	63	25	
			4	400	7.3	330	63	25	
			5	500	7.4	340	62	25 (5)	
OW-7R	783.52	9	1	10	6.0	49	72	20	Bladder pump
			2	20	5.6	45	71	7	
			3	30	5.7	43	71	8	
CL-03-WP	781.31	8	1	8	6.7	393	74	11	Bladder pump
			2	16	7.1	375	70	4	
			3	25	7.2	410	71	3	
CL-04-WP (6)	756.59	0.1	--	--	--	--	--	--	Bladder pump
CL-05-WP	777.99	7.0	1	7	7.3	693	69	49	Bladder pump
			2	14	7.3	686	68	35	
			3	21	7.4	691	68	18	
CL-06-WP (6)	Dry	0.0	--	--	--	--	--	--	Bladder pump
CL-07-WP (6)	792.75	0.1	--	--	--	--	--	--	Bladder pump

TABLE 2

WELL PURGING DATA SUMMARY
ROUND THREE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
JULY 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
CL-09-WP	785.03	2.3	1	2	7.6	435	70	28	Peristaltic pump
			2	4	7.2	401	68	11	
			3	6	7.2	400	69	6	
			4	10	7.2	403	68	6	

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain rust particles.
(6) Well was dry.

TABLE 3

SAMPLE KEY/FIELD DATA
ROUND THREE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JULY 1995

Sample Number	*Source*	*Turbidity (NTUs)*	*Parameters*	*Method*	*Comments*
GW-3482-JOS-071995-01	OW-7R	8	(1)	(2)	
GW-3482-JOS-071995-03	CL-03-WP	3	(1)	(2)	GW-3482-JOS-071995-02 (Duplicate)
GW-3482-JOS-071995-04	OW-4	14	(1)	(2)	
GW-3482-JOS-072095-05 MS/MSD	OW-1	9	(1)	(2)	Matrix Spike/Matrix Spike Duplicate
GW-3482-JOS-072095-06	OW-2	7	(1)	(2)	
GW-3482-JOS-072095-07	OW-5	2	(1)	(2)	
GW-3482-JOS-072195-08	CL-05-WP	18	(1)	(2)	
GW-3482-JOS-072195-09	CL-09-WP	6	(1)	(2)	
GW-3482-JOS-072295-010	OW-3	25	(1)	(3)	
GW-3482-JOS-072395-011	OW-6B	25	(1)	(3)	
SW-3482-JOS-072195-01	Coke Pond	--	(5)	--	Surface water grab sample
RB-1	Bladder pump	--	(1)	--	Rinsate blank prior to use in CL-05-WP

Notes:

(1) Beryllium, cadmium, chromium, lead, manganese
(2) Bladder pump
(3) Disposable teflon bailer
(4) Peristaltic pump
(5) Aluminum, chromium, copper, lead, nickel, and zinc

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(770) 441-0027

MEMO

TO: Mike Mateyk

REFERENCE NO: 3482

FROM: John Schwaller

DATE: November 1, 1995

RE: Round Four Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the fourth round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 13 of 13 monitoring wells (of all monitoring wells);
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
v) sampling 1 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods October 23 through October 26, 1995.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, temperature, and turbidity were measured after each well volume. Purging continued until stabilization of pH, conductivity, and temperature had been achieved. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of the groundwater sample collected from monitoring well OW-6B, exhibited a turbidity of 10 NTUs or less. The degradation of the carbon steel casing at monitoring well OW-6B is producing rust particles and iron algae growth which cannot be removed or diminished through additional purging or reduced flow.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/br/14

c.c. Hadley Bedbury - Maxus Energy
Gordon Tate - Superior Consultants
David Johnson - City of Cedartown

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1995	*April 1995*	*July 1995*	*October 1995*
OW-1	823.80	786.26	787.35	778.35	784.60
OW-2	827.50	780.05	779.81	772.92	779.48
OW-3	803.29	773.79	779.08	764.97	773.81
OW-4	801.52	763.10	764.98	759.17	765.45
OW-5	797.92	774.64	776.58	773.42	774.56
OW-6B	805.12	785.35	791.00	779.94	786.62
OW-7R	809.30	784.48	788.75	783.52	784.70
CL-03-WP	836.41	786.54	791.47	781.31	785.41
CL-04-WP	796.81	761.33	764.30	756.59	763.50
CL-05-WP	853.34	780.22	783.40	777.99	778.23
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18
CL-07-WP	824.90	801.09	801.42	792.75	792.75
CL-09-WP	803.18	788.74	794.96	785.03	790.28

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND FOUR QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
OCTOBER 1995

Well Number	*Water Level (ft. AMSL)(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µs/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	786.15	5	5	20	--	--	--	2	Bladder pump
OW-2	781.15	2	5	10	--	--	--	2	Bladder pump
OW-3	776.87	23	5	100	--	--	--	4	Bladder pump
OW-4	766.45	4	5	20	--	--	--	8	Bladder pump
OW-5	774.99	10	5	50	--	--	--	4	Bladder pump
OW-6B	789.14	90	1	5	450	--	--	70(5)	Airlift pump
OW-7R	787.35	10	1	10	6.0	44	66	40	Bladder pump
			2	20	6.4	42	68	10	
			3	30	6.4	43	68	6	
CL-03-WP	789.95	8	1	10	7.2	160	68	18	Bladder pump
			2	20	6.9	154	64	12	
			3	30	7.1	156	62	10	
CL-04-WP	767.81	1	1	1.5	6.8	399	72	6	Bladder pump
			2	3.0	7.2	210	68	9	
			3	4.5	7.0	242	69	11	
			4	6.0	7.2	257	70	2	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND FOUR QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
OCTOBER 1995

Well Number	*Water Level (ft. AMSL)(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µs/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
CL-05-WP	782.22	7.0	1	7	7.9	2.85	59	18	Bladder pump
			2	14	7.8	292	58	33	
			3	21	7.5	292	59	10	
CL-06-WP (6)	777.78	0.6	--	--	--	--	--	--	Bladder pump
CL-07-WP (6)	792.81	0.1	--	--	--	--	--	--	Bladder pump
CL-09-WP	793.95	4	1	3	7.4	219	63	35	Peristaltic pump
			2	6	7.4	212	65	10	
			3	10	7.3	210	68	4	

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain rust particles.
(6) Well was dry.

TABLE 3

SAMPLE KEY/FIELD DATA
ROUND FOUR QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
OCTOBER 1995

Sample Number	*Source*	*Turbidity (NTUs)*	*Parameters*	*Method*	*Comments*
GW-3482-JOS-102395-01	CL-04-WP	2	(1)	(2)	
GW-3482-JOS-102395-02	OW-2	2	(1)	(2)	
GW-3482-JOS-102495-03 MS/MSD	OW-7R	6	(1)	(2)	Matrix spike/matrix spike duplicate
GW-3482-JOS-102495-04	OW-1	2	(1)	(2)	
GW-3482-JNP-102595-05	OW-4	6	(1)	(2)	GW-3482-JOS-102595-06 (Duplicate)
GW-3482-JNP-102595-07	OW-5	6	(1)	(2)	
GW-3482-JOS-102595-08	Bladder Pump	--	(1)		Rinsate blank prior to use in CL-03-WP
GW-3482-JOS-102595-09	CL-03-WP	10	(1)	(2)	
GW-3482-JOS-102695-10	CL-05-WP	10	(1)	(2)	
GW-3482-JOS-102695-11	CL-09-WP	4	(1)	(4)	
SW-3482-JOS-102695-12	OW-3	3	(1)	(2)	
SW-3482-JOS-102695-13	OW-6B	65	(1)	(3)	
SW-3482-JOS-102595-01	Coke Pond	--	(5)		Surface water grab sample

Notes:

(1) Beryllium, cadmium, chromium, lead, manganese
(2) Bladder pump
(3) Disposable teflon bailer
(4) Peristaltic pump
(5) Aluminum, chromium, copper, lead, nickel, and zinc

CRA
1351 Oakbrook Drive
Suite #150
Norcross. Georgia 30093
(770) 441-0027

MEMO

TO: Mike Mateyk | REFERENCE NO: 3482

FROM: John Schwaller | DATE: January 9, 1996

RE: Round Five Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the fifth round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 13 of 13 monitoring wells;
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
v) sampling 1 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods January 2 through January 5, 1996.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, and temperature could not be recorded due to faulty equipment and delayed replacement. Purging consisted of the removal of five well volumes of groundwater. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 <u>Groundwater Sampling</u>

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of groundwater samples collected from monitoring well OW-6B and CL-03-WP, exhibited a turbidity of 10 NTUs or less.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/br/15

c.c. Hadley Bedbury - Maxus Energy

Gordon Tate - Superior Consultants
David Johnson - City of Cedartown

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*				
		January 1995	*April 1995*	*July 1995*	*October 1995*	*January 1996*
OW-1	823.80	786.26	787.35	778.35	784.60	786.15
OW-2	827.50	780.05	779.81	772.92	779.48	781.15
OW-3	803.29	773.79	779.08	764.97	773.81	776.87
OW-4	801.52	763.10	764.98	759.17	765.45	766.45
OW-5	797.92	774.64	776.58	773.42	774.56	774.99
OW-6B	805.12	785.35	791.00	779.94	786.62	789.14
OW-7R	809.30	784.48	788.75	783.52	784.70	787.35
CL-03-WP	836.41	786.54	791.47	781.31	785.41	789.95
CL-04-WP	796.81	761.33	764.30	756.59	763.50	767.81
CL-05-WP	853.34	780.22	783.40	777.99	778.23	782.22
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18	777.78
CL-07-WP	824.90	801.09	801.42	792.75	792.75	792.81
CL-09-WP	803.18	788.74	794.96	785.03	790.28	793.95

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND FIVE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	786.15	4	5	20	--	--	--	2	Bladder pump
OW-2	781.15	2	5	10	--	--	--	2	Bladder pump
OW-3	776.87	23	5	100	--	--	--	4	Bladder pump
OW-4	766.45	4	5	20	--	--	--	8	Bladder pump
OW-5	774.99	10	5	50	--	--	--	4	Bladder pump
OW-6B	789.14	90	5	450	--	--	--	70(5)	Airlift pump
OW-7R	787.35	10	5	50	--	--	--	7	Bladder pump
CL-03-WP	789.95	9	5	45	--	--	--	15	Bladder pump
CL-04-WP	767.81	2	5	10	--	--	--	7	Bladder pump
CL-05-WP	782.22	7	5	35	--	--	--	4	Bladder pump
CL-06-WP (6)	777.78	0.8	--	--	--	--	--	--	Bladder pump
CL-07-WP (6)	792.81	0.1	--	--	--	--	--	--	Bladder pump
CL-09-WP	793.95	4	5	20	--	--	--	3	Peristaltic pump

3482-M-15-T2

TABLE 2

WELL PURGING DATA SUMMARY
ROUND FIVE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
JANUARY 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*

Notes:

-- - Instrument inoperable.
(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain rust particles.
(6) Well was dry.

TABLE 3

SAMPLE KEY/FIELD DATA
ROUND FIVE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1996

Sample Number	*Source*	*Turbidity (NTUs)*	*Parameters*	*Method*	*Comments*
GW-3482-JOS-010296-01	CL-04-WP	7	(1)	(2)	
GW-3482-JOS-010296-02	OW-4	8	(1)	(2)	GW-3482-JOS-010296-03 (duplicate)
GW-3482-JOS-010296-04 MS/MSD	CL-09-WP	3	(1)	(4)	Matrix spike/matrix spike duplicate
GW-3482-JOS-010396-05	OW-7R	7	(1)	(2)	
GW-3482-JNP-010396-06	OW-6B	70	(1)	(3)	
GW-3482-JNP-010396-07	CL-03-WP	15	(1)	(2)	
GW-3482-JOS-010396-08	Bladder Pump	--	(1)		Rinsate blank prior to use in OW-1
GW-3482-JOS-010396-09	OW-2	2	(1)	(2)	
GW-3482-JOS-010396-10	OW-1	4	(1)	(2)	
GW-3482-JOS-010496-11	OW-3	4	(1)	(2)	
GW-3482-JOS-010496-12	OW-5	4	(1)	(2)	
GW-3482-JOS-010496-13	CL-05-WP	4	(1)	(2)	
SW-3482-JOS-010396-01	Coke Pond	--	(5)		Surface water grab sample

Notes:

(1) Beryllium, cadmium, chromium, lead, manganese
(2) Bladder pump
(3) Disposable teflon bailer
(4) Peristaltic pump
(5) Aluminum, chromium, copper, lead, nickel, and zinc

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(770) 441-0027

MEMO

TO: Mike Mateyk | REFERENCE NO: 3482

FROM: John Schwaller | DATE: April 29, 1996

RE: Round Six Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the sixth round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

- i) well inspections;
- ii) water level measurements;
- iii) purging 13 of 13 monitoring wells;
- iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
- v) sampling 3 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
- vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods April 22 through April 25, 1996.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, and temperature were recorded after each volume was removed. Purging continued until stabilization of these field parameters occurred. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of groundwater samples collected from monitoring well OW-6B and CL-03-WP, exhibited a turbidity of 10 NTUs or less.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/kt/16

c.c. David Johnson - City of Cedartown

Hadley Bedbury - Maxus Energy
Gordon Tate - Superior Consultants

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*					
		January 1995	*April 1995*	*July 1995*	*October 1995*	*January 1996*	*April 1996*
OW-1	823.80	786.26	787.35	778.35	784.60	786.15	787.60
OW-2	827.50	780.05	779.81	772.92	779.48	781.15	782.47
OW-3	803.29	773.79	779.08	764.97	773.81	776.87	778.90
OW-4	801.52	763.10	764.98	759.17	765.45	766.45	768.47
OW-5	797.92	774.64	776.58	773.42	774.56	774.99	776.34
OW-6B	805.12	785.35	791.00	779.94	786.62	789.14	792.84
OW-7R	809.30	784.48	788.75	783.52	784.70	787.35	790.98
CL-03-WP	836.41	786.54	791.47	781.31	785.41	789.95	790.89
CL-04-WP	796.81	761.33	764.30	756.59	763.50	767.81	766.61
CL-05-WP	853.34	780.22	783.40	777.99	778.23	782.22	786.69
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18	777.78	775.16
CL-07-WP	824.90	801.09	801.42	792.75	792.75	792.81	800.44
CL-09-WP	803.18	788.74	794.96	785.03	790.28	793.95	796.62

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND SIX QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	787.60	4.1	1	4	6.4	236	64	282	Bladder pump
			2	8	7.0	240	64	45	
			3	12	6.6	239	63	29	
			4	16	7.2	247	64	7	
OW-2	782.47	2.4	1	2.5	7.0	266	64	3	Bladder pump
			2	5.0	7.1	269	64	4	
			3	7.5	7.0	266	63	1	
OW-3	778.90	23.4	1	25	8.1	125	65	5	Bladder pump
			2	50	7.0	181	61	5	
			3	75	7.1	180	62	5	
			4	100	7.1	184	62	5	
OW-4	768.47	4.6	1	5	6.4	993	64	6	Bladder pump
			2	10	6.9	1004	65	5	
			3	15	6.7	1020	65	3	
OW-5	776.34	10.1	1	10	7.8	181	70	12	Bladder pump
			2	20	8.3	180	69	7	
			3	30	8.2	184	68	5	
OW-6B	792.84	103.3	1	100	6.3	102	61	88	Airlift pump
			2	200	6.4	110	62	75	
			3	300	6.5	95	63	68 (5)	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND SIX QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-7R	790.98	10.5	1	10	7.3	28	63	12	Bladder pump
			2	20	6.8	15	65	11	
			3	30	6.6	21	65	9	
CL-03-WP	790.89	9.0	1	9	7.8	150	64	28	Bladder pump
			2	18	8.0	144	61	25	
			3	27	7.8	150	62	12	
			4	36	7.8	150	61	8	
CL-04-WP	766.61	1.7	1	2	7.9	112	72	80	Bladder pump
			2	4	8.0	113	72	83	
			3	6	8.1	118	74	87	
			4	8	7.9	108	73	75	
			5	10	7.8	104	73	4	
CL-05-WP	786.69	8.1	1	8	7.5	239	64	32	Bladder pump
			2	16	7.4	250	67	23	
			3	25	7.8	235	68	22	
CL-06-WP	775.16	0.4	1	0.5	7.8	225	65	9	Bladder pump
			2	1.0	7.9	215	65	8	
			3	1.5	7.9	220	65	7	
CL-07-WP	800.44 (6)	1.3	1	1.5	7.1	481	65	52	Bladder pump

TABLE 2

WELL PURGING DATA SUMMARY
ROUND SIX QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
CL-09-WP	796.62	4.2	1	4	7.1	210	73	5	Peristaltic pump
			2	8	7.2	204	73	3	
			3	12	7.2	175	74	2	

Notes:

(1) Elevations are feet above mean sea level.

(2) micromhos

(3) Degrees Fahrenheit

(4) Nephelometric units

(5) Sample observed to contain rust particles.

(6) Well was purged dry and recharged sufficiently to sample.

TABLE 3

SAMPLE KEY/FIELD KEY
ROUND SIX QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1996

Sample Number	*Source*	*Turbidity*	*Parameters*	*Method*	*Comments*
GW-3482-JOS-042296-01	Bladder pump	--	(1)	--	Rinsate blank prior to use in CL-04-WP
GW-3482-JOS-042296-02	CL-04-WP	4	(1)	(2)	GW-3482-JOS-042296-03 (duplicate)
GW-3482-JOS-042296-04	OW-5	5	(1)	(2)	
GW-3482-JOS-042396-05	OW-1	7	(1)	(2)	
GW-3482-JOS-042396-06 MS/MSD	OW-2	1	(1)	(2)	Matrix spike/Matrix spike duplicate
GW-3482-JOS-042396-07	CL-06-WP	7	(1)	(2)	
GW-3482-JOS-042396-08	CL-05-WP	22	(1)	(2)	
GW-3482-JOS-042396-09	CL-03-WP	8	(1)	(2)	
GW-3482-JOS-042396-10	OW-3	5	(1)	(2)	
GW-3482-JOS-042496-11	OW-7R	9	(1)	(2)	
GW-3482-JOS-042496-12	OW-6B	68	(1)	(3)	
GW-3482-JOS-042496-13	OW-4	3	(1)	(2)	
GW-3482-JOS-042496-14	CL-09-WP	2	(1)	(4)	
GW-3482-JOS-042496-15	CL-07-WP	52	(1)	(2)	
SW-3482-JOS-042496-01	Coke Pond	--	(5)	--	Surface water grab sample

Notes:

(1) Beryllium, cadmium, chromium, lead, manganese
(2) Bladder pump
(3) Disposable Teflon bailer
(4) Peristaltic pump
(5) Aluminum, chromium, copper, lead, nickel, zinc

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(770) 441-0027

MEMO

TO: Mike Mateyk | REFERENCE NO: 3482

FROM: John Schwaller/kt/2 | DATE: July 27, 1996

RE: Round Seven Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the seventh round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 10 of 13 monitoring wells;
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
v) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

Interior monitoring wells CL-05-WP, CL-06-WP, and CL-07-WP were not sampled during this round as they are scheduled to be sampled only twice during this year in accordance with the approved RD/RA work plan.

This round of sample collection occurred during the periods July 8 through July 11, 1996.

Groundwater samples collected from monitoring wells OW-1 and CL-03-WP were broken during transport; therefore, groundwater samples were recollected from these monitoring wells on July 26, 1996.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, and temperature were recorded after each volume was removed. Purging continued until stabilization of these field parameters occurred. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of the groundwater sample collected from monitoring well OW-6B exhibited a turbidity of 10 NTUs or less.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

c.c. David Johnson - City of Cedartown
Bill Hutton - Maxus Energy
Gordon Tate - Superior Consultants

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*						
		January 1995	*April 1995*	*July 1995*	*October 1995*	*January 1996*	*April 1996*	*July 1996*
OW-1	823.80	786.26	787.35	778.35	784.60	786.15	787.60	781.59
OW-2	827.50	780.05	779.81	772.92	779.48	781.15	782.47	776.69
OW-3	803.29	773.79	779.08	764.97	773.81	776.87	778.90	768.90
OW-4	801.52	763.10	764.98	759.17	765.45	766.45	768.47	762.06
OW-5	797.92	774.64	776.58	773.42	774.56	774.99	776.34	774.43
OW-6B	805.12	785.35	791.00	779.94	786.62	789.14	792.84	783.82
OW-7R	809.30	784.48	788.75	783.52	784.70	787.35	790.98	787.35
CL-03-WP	836.41	786.54	791.47	781.31	785.41	789.95	790.89	785.33
CL-04-WP	796.81	761.33	764.30	756.59	763.50	767.81	766.61	760.41
CL-05-WP	853.34	780.22	783.40	777.99	778.23	782.22	786.69	-- (3)
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18	777.78	775.16	-- (3)
CL-07-WP	824.90	801.09	801.42	792.75	792.75	792.81	800.44	-- (3)
CL-09-WP	803.18	788.74	794.96	785.03	790.28	793.95	796.62	788.73

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.
(3) Not sampled.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND SEVEN QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JULY 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1 (5)	781.59	3.0	1	3	7.2	325	67	56	Bladder pump
			2	6	7.1	348	65	8	
			3	9	7.0	345	67	1.5	
OW-2	776.69	1.5	1	1.5	7.2	338	68	2	Bladder pump
			2	3.0	7.2	311	66	2	
			3	5.0	7.0	327	66	1.4	
OW-3	768.90	21.7	1	22	6.9	375	69	3	Bladder pump
			2	44	6.6	526	68	2	
			3	66	6.5	497	70	2.3	
OW-4	762.06	3.6	1	4	6.9	2180	72	7.5	Bladder pump
			2	8	6.9	1930	68	6.0	
			3	12	6.8	1890	68	2.5	
OW-5	774.43	9.8	1	10	8.3	195	71	4	Bladder pump
			2	20	7.8	195	70	2.5	
			3	30	7.7	191	70	2.5	
OW-6B	783.82	63.5	1	64	7.2	133	67	105	Airlift pump
			2	128	6.6	120	68	104	
			3	192	7.1	115	70	92 (6)	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND SEVEN QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JULY 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-7R	787.35	9.9	1	10	5.5	44	70	4	Bladder pump
			2	20	5.3	46	70	2.5	
			3	30	5.4	45	73	2.0	
CL-03-WP (5)	785.33	8.0	1	8	7.7	163	68	26	Bladder pump
			2	16	7.6	165	69	15	
			3	24	7.7	165	68	8	
CL-04-WP	760.41	0.8	1	1	7.0	363	70	>100	Bladder pump
			2	2	6.7	331	72	20	
			3	4	6.5	273	68	2.5	
CL-09-WP	788.73	2.9	1	3	6.9	350	72	5	Peristaltic pump
			2	6	6.8	330	71	2	
			3	9	6.7	307	70	2	

Notes:

(1) Elevations are feet above mean sea level.

(2) micromhos

(3) Degrees Fahrenheit

(4) Nephelometric units

(5) Monitoring well was resampled on July 26, 1996.

(6) Sample observed to contain rust particles.

TABLE 3

SAMPLE KEY
ROUND SEVEN QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JULY 1996

Sample Number	*Source*	*Turbidity (NTUs) (1)*	*Parameters*	*Method*	*Comments*
GW-3482-070996-JOS-01	CL-04-WP	2.5	(2)	(3)	
GW-3482-070996-JOS-02	OW-4	2.5	(2)	(3)	
GW-3482-071096-JOS-03	Bladder Pump	--	(2)	--	Rinsate blank prior to use in OW-5
GW-3482-071096-JOS-04	OW-5	2.0	(2)	(3)	
GW-3482-071096-JOS-05 MS/MSD	OW-7R	2.0	(2)	(3)	Matrix spike/Matrix spike duplicate
GW-3482-071096-JOS-06	OW-2	1.4	(2)	(3)	GW-3482-071096-JOS-07 (duplicate)
GW-3482-072696-JOS-01 (4)	OW-1	1.5	(2)	(3)	
GW-3482-071096-JOS-09	CL-09-WP	2.0	(2)	(5)	
GW-3482-072696-JOS-02 (4)	CL-03-WP	8.0	(2)	(3)	
GW-3482-071196-JOS-11	OW-3	2.3	(2)	(3)	
GW-3482-071196-JOS-12	OW-6B	92	(2)	(6)	
SW-3482-071196-JOS-01	Coke Pond	--	(7)	--	Surface water grab sample

Notes:

(1) Nephelometric units.

(2) Beryllium, cadmium, chromium, lead, manganese.

(3) Bladder pump.

(4) Monitoring well was resampled on July 26, 1996.

(5) Peristaltic pump.

(6) Disposable Teflon bailer.

(7) Aluminum, chromium, copper, lead, nickel, zinc.

CRA
.351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(770) 441-0027

MEMO

TO: Mike Mateyk   REFERENCE NO: 3482

FROM: John Schwaller/kt/4   DATE: November 1, 1996

RE: Round Eight Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the eighth round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 10 of 13 monitoring wells;
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
v) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

No groundwater sample was collected from interior monitoring well CL-05-WP as this monitoring well was sampled twice this year in accordance with the approved RD/RA work plan. Interior monitoring wells CL-06-WP and CL-07-WP remained dry, therefore a sample could not be collected.

This round of sample collection occurred during the periods October 23 through October 28, 1996. CRA staff was assisted by City of Cedartown personnel in the sample collection activities. This is an effort to train the City of Cedartown personnel in order to transfer future sample collection responsibilities to the City of Cedartown.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, and temperature were recorded after each volume was removed. Purging continued until stabilization of these field parameters occurred. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, an attempt to achieve the original goal of 50 NTUs was made. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of the groundwater sample collected from monitoring well OW-6B exhibited a turbidity of 10 NTUs or less.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

c.c. David Johnson - City of Cedartown
Bill Hutton - Maxus Energy
Gordon Tate - Superior Consultants

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1995	*April 1995*	*July 1995*	*October 1995*
OW-1	823.80	786.26	787.35	778.35	784.60
OW-2	827.50	780.05	779.81	772.92	779.48
OW-3	803.29	773.79	779.08	764.97	773.81
OW-4	801.52	763.10	764.98	759.17	765.45
OW-5	797.92	774.64	776.58	773.42	774.56
OW-6B	805.12	785.35	791.00	779.94	786.62
OW-7R	809.30	784.48	788.75	783.52	784.70
CL-03-WP	836.41	786.54	791.47	781.31	785.41
CL-04-WP	796.81	761.33	764.30	756.59	763.50
CL-05-WP	853.34	780.22	783.40	777.99	778.23
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18
CL-07-WP	824.90	801.09	801.42	792.75	792.75
CL-09-WP	803.18	788.74	794.96	785.03	790.28

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.
(3) Not sampled.

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1996	*April 1996*	*July 1996*	*October 1996*
OW-1	823.80	786.15	787.60	781.59	781.25
OW-2	827.50	781.15	782.47	776.69	776.61
OW-3	803.29	776.87	778.90	768.90	768.36
OW-4	801.52	766.45	768.47	762.06	761.92
OW-5	797.92	774.99	776.34	774.43	774.25
OW-6B	805.12	789.14	792.84	783.82	783.12
OW-7R	809.30	787.35	790.98	787.35	786.14
CL-03-WP	836.41	789.95	790.89	785.33	785.01
CL-04-WP	796.81	767.81	766.61	760.41	758.04
CL-05-WP	853.34	782.22	786.69	-- (3)	-- (3)
CL-06-WP	861.02	777.78	775.16	-- (3)	-- (3)
CL-07-WP	824.90	792.81	800.44	-- (3)	-- (3)
CL-09-WP	803.18	793.95	796.62	788.73	788.42

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.
(3) Not sampled.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND EIGHT QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
OCTOBER 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	781.25	3.1	1	3	7.2	632	59	250	Bladder pump
			2	6	7.0	600	59	30	
			3	9	7.1	610	59	10	
OW-2	776.61	1.5	5	8	--	--	--	7	Bladder pump
OW-3	768.36	21.6	1	22	--	490	71	3	Bladder pump
			2	44	--	520	73	4	
			3	66	--	460	69	3	
OW-4	761.92	3.6	1	4	6.9	2030	63	28	Bladder pump
			2	8	7.1	1880	61	10	
			3	12	7.2	1860	59	7	
OW-5	774.25	9.8	1	10	6.5	421	71	4	Bladder pump
			2	20	7.1	447	70	2	
			3	30	7.3	408	69	2	
OW-6B	783.12	63.0	1	64	6.6	343	68	300	Airlift pump
			2	128	6.7	340	68	280	
			3	192	6.8	345	68	78 (5)	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND EIGHT QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
OCTOBER 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-7R	786.11	9.7	1	10	--	32	59	11	Bladder pump
			2	20	--	30	62	12	
			3	30	--	34	67	4	
CL-03-WP	785.01	8.1	1	8	--	487	59	37	Bladder pump
			2	16	--	459	60	20	
			3	24	--	446	62	8	
CL-04-WP	758.04	0.4	5	2	6.1	340	63	8	Bladder pump
CL-09-WP	788.42	2.8	1	3	6.4	369	64	--	Peristaltic pump
			2	6	6.6	389	67	2	
			3	10	6.3	410	71	1	

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain rust particles.
-- - No measurement taken.

TABLE 3

SAMPLE KEY
ROUND EIGHT QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
OCTOBER 1996

Sample Number	*Source*	*Turbidity (NTUs) (1)*	*Parameters*	*Method*	*Comments*
GW-3482-102396-JOS-01	CL-04-WP	8	(2)	(3)	
GW-3482-102396-JOS-02 MS/MSD	CL-09-WP	1	(2)	(4)	Matrix spike/Matrix spike duplicate
GW-3482-102396-JOS-03	OW-5	2	(2)	(3)	GW-3482-102396-JOS-04 (duplicate)
GW-3482-102396-JOS-05	OW-4	7	(2)	(3)	
GW-3482-102496-JOS-06	OW-2	7	(2)	(3)	
GW-3482-102496-JOS-07	OW-7R	4	(2)	(3)	
GW-3482-102496-JOS-08	Bladder Pump	--	(2)	--	Rinsate blank prior to use in OW-3
GW-3482-102496-JOS-09	OW-3	3	(2)	(3)	
GW-3482102596-JOS-10	OW-1	10	(2)	(3)	
GW-3482-102596-JOS-11	CL-03-WP	8	(2)	(3)	
GW-3482-102896-JOS-12	OW-6B	78	(2)	(5)	
SW-3482-102896-JOS-01	Coke Pond	--	(6)	--	Surface water grab sample

Notes:

(1) Nephelometric units.

(2) Beryllium, cadmium, chromium, lead, manganese.

(3) Bladder pump.

(4) Peristaltic pump.

(5) Disposable Teflon bailer.

(6) Aluminum, chromium, copper, lead, nickel, zinc.

ᒐRA
3.. Oakbrook Drive
; e #150
I cross, Georgia 30093
7/0) 441-0027

MEMO

[ ): Mike Mateyk

REFERENCE NO: 3482

:'ᴾOM: Neil Pickard/sc/5

DATE: March 4, 1997

ᖇE: USEPA Requested Groundwater Sampling Event
Cedartown Municipal Landfill Site - Cedartown, Georgia

INTRODUCTION

The following technical memorandum summarizes the field activities associated with the groundwater sampling at the Cedartown Municipal Landfill Site (CML Site) as requested by USEPA in a letter dated January 13, 1997 (Godfrey to Johnson). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 11 of 13 monitoring wells;
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
v) sampling 1 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead and manganese analysis.

This round of sample collection occurred between February 8 through February 18, 1997. A groundwater sample was not collected from interior monitoring wells CL-06-WP and CL-07-WP due to an insufficient amount of groundwater. CRA staff was assisted by City of Cedartown personnel in the sample collection activities.

The following sections in this memorandum describe the field activities.

:.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, and temperature were recorded after each volume was removed. Purging continued until stabilization of these field parameters occurred. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, an attempt to achieve the original goal of 50 NTUs was made. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of the groundwater samples collected from monitoring wells OW-6B and CL-05-WP, exhibited a turbidity of 10 NTUs or less.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

SURFACE WATER SAMPLING PROCEDURES

No surface water samples were collected during this sampling event.

DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

David Johnson - City of Cedartown
Bill Hutton - Maxus Energy
Gordon Tate - Superior Consultants

WELL PURGING DATA SUMMARY
GROUNDWATER SAMPLING EVENT
CEDARTOWN MUNICIPAL LANDFILL SITE
FEBRUARY 1997

Well Number	Water Level (ft. AMSL) (1)	Initial Well Volume (gallons)	Volume Number	Total Gallons Purged	pH	Conductivity (µS/cm) (2)	Temperature (°F) (3)	Turbidity (NTUs) (4)	Method
OW-1	791.15	4.7	1	5	6.8	279	67	31	Bladder pump
			2	10	7.2	332	63	6	
			3	15	7.3	269	65	2	
OW-2	786.17	3.0	1	3	7.4	490	57	4	Bladder pump
			2	6	7.2	494	57	1	
			3	9	7.3	495	58	1	
OW-3	783.19	24.1	1	25	6.9	198	64	5	Bladder pump
			2	50	6.9	212	68	7	
			3	75	7.1	188	67	4	
OW-4	775.77	5.8	1	6	6.0	1616	51	3	Bladder pump
			2	13	7.0	1652	52	5	
			3	20	7.1	1733	55	5	
OW-5	780.11	10.8	1	11	7.0	368	57	2	Bladder pump
			2	22	7.3	341	57	3	
			3	33	7.7	324	55	3	
OW-6B	797.12	93.0	1	93	6.4	331	53	66	Airlift pump
			2	186	6.0	260	58	82	
			3	280	5.3	184	57	55	

WELL PURGING DATA SUMMARY
GROUNDWATER SAMPLING EVENT
CEDARTOWN MUNICIPAL LANDFILL SITE
FEBRUARY 1997

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (μS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-7R	791.80	10.7	5	55	6.9	28	53	2	Bladder pump
CL-03-WP	795.46	9.8	1	10	7.8	137	64	18	Bladder pump
			2	20	7.9	132	61	13	
			3	30	8.0	138	59	9	
CL-04-WP	777.48	3.5	5	17.5	6.3	115	58	1.5	Bladder pump
CL-05-WP	786.67	8.1	1	8	7.5	683	56	18	Bladder pump
			2	16	8.3	688	59	18	
			3	24	8.6	635	54	24	
CL-09-WP	788.42	4.7	1	5	6.9	320	59	2	Peristaltic pump
			2	10	6.9	319	58	1	
			3	15	7.1	288	57	1	

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
-- - No measurement taken.

SAMF KEY
GROUNDWATER SAMPLING EVENT
CEDARTOWN MUNICIPAL LANDFILL SITE
FEBRUARY 1997

Sample Number	*Source*	*Turbidity (NTUs) (1)*	*Parameters*	*Method*	*Comments*
GW-3482-020897-NP-01 MS/MD	CL-09-WP	1	(2)	(4)	Matrix spike/Matrix spike duplicate
GW-3482-020997-NP-02	CL-04-WP	1.5	(2)	(3)	
GW-3482-020997-NP-03	OW-5	3	(2)	(3)	GW-3482-020997-JOS-04 (duplicate)
GW-3482-020997-NP-05	OW-4	5	(2)	(3)	
GW-3482-0210997-NP-06	OW-7R	2	(2)	(3)	
GW-3482-021197-NP-07	OW-6B	55	(2)	(3)	
GW-3482-021297-NP-08	Bladder Pump	--	(2)	--	Rinsate blank prior to use in OW-2
GW-3482-021297-NP-09	CL-05-WP	24	(2)	(3)	
GW-3482-021297-NP-10	OW-2	1	(2)	(3)	
GW-3482-021797-NP-11	OW-1	2	(2)	(3)	
GW-3482-021797-NP-12	CL-03-WP	9	(2)	(5)	
GW-3482-021897-NP-13	OW-3	4	(2)	(3)	

Notes:

(1) Nephelometric units.
(2) Beryllium, cadmium, chromium, lead, manganese.
(3) Bladder pump.
(4) Peristaltic pump.
(5) Airlift pump

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(770) 441-0027

MEMO

TO: Mike Mateyk | REFERENCE NO: 3482

FROM: John Schwaller/kt/6 | DATE: September 16, 1997

RE: USEPA Requested Groundwater Sampling Event
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the groundwater sampling at the Cedartown Municipal Landfill Site (CML Site) as requested by USEPA in a letter dated June 12, 1997 (Godfrey to Johnson). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 13 of 13 monitoring wells;
iv) sampling 9 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, manganese, chloride, sodium, sulfate, vanadium, and zinc analysis; and
v) sampling 1 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, manganese, chloride, sodium, sulfate, vanadium, and zinc analysis.

This round of sample collection occurred between September 8 through September 10, 1997. A groundwater sample was not collected from perimeter monitoring well CL-04-WP or interior monitoring wells CL-06-WP and CL-07-WP due to an insufficient amount of groundwater. These monitoring wells were checked for the presence of groundwater on the days following the purging event; no groundwater was detected in the monitoring wells.

Sampling activities were observed by a USEPA representative, Mr. Timothy Simpson of the Environmental Services Division.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, and temperature were recorded after each volume was removed. Purging continued until stabilization of these field parameters occurred. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, an attempt to achieve the original goal of 50 NTUs was made. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 <u>Groundwater Sampling</u>

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, manganese, chloride, sodium, sulfate, vanadium, and zinc. All groundwater samples, with the exception of the groundwater samples collected from monitoring wells OW-6B and CL-05-WP, exhibited a turbidity of 10 NTUs or less.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

No surface water samples were collected during this sampling event.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

c.c. David Johnson - City of Cedartown
Bill Hutton - Chemical Land Holdings
Gordon Tate - Superior Consultants

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1995	*April 1995*	*July 1995*	*October 1995*
OW-1	823.80	786.26	787.35	778.35	784.60
OW-2	827.50	780.05	779.81	772.92	779.48
OW-3	803.29	773.79	779.08	764.97	773.81
OW-4	801.52	763.10	764.98	759.17	765.45
OW-5	797.92	774.64	776.58	773.42	774.56
OW-6B	805.12	785.35	791.00	779.94	786.62
OW-7R	809.30	784.48	788.75	783.52	784.70
CL-03-WP	836.41	786.54	791.47	781.31	785.41
CL-04-WP	796.81	761.33	764.30	756.59	763.50
CL-05-WP	853.34	780.22	783.40	777.99	778.23
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18
CL-07-WP	824.90	801.09	801.42	792.75	792.75
CL-09-WP	803.18	788.74	794.96	785.03	790.28

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.
(3) Not sampled.

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*					
		January 1996	*April 1996*	*July 1996*	*October 1996*	*February 1997*	*September 199'*
OW-1	823.80	786.15	787.60	781.59	781.25	791.15	778.68
OW-2	827.50	781.15	782.47	776.69	776.61	786.17	773.94
OW-3	803.29	776.87	778.90	768.90	768.36	783.19	766.51
OW-4	801.52	766.45	768.47	762.06	761.92	775.77	765.65
OW-5	797.92	774.99	776.34	774.43	774.25	780.11	780.11
OW-6B	805.12	789.14	792.84	783.82	783.12	797.12	782.17
OW-7R	809.30	787.35	790.98	787.35	786.14	791.80	785.88
CL-03-WP	836.41	789.95	790.89	785.33	785.01	795.46	783.72
CL-04-WP	796.81	767.81	766.61	760.41	758.04	777.48	757.18(3)
CL-05-WP	853.34	782.22	786.69	-- (3)	-- (3)	786.67	780.04
CL-06-WP	861.02	777.78	775.16	-- (3)	-- (3)	--(3)	772.93(3)
CL-07-WP	824.90	792.81	800.44	-- (3)	-- (3)	--(3)	799.25(3)
CL-09-WP	803.18	793.95	796.62	788.73	788.42	800.03	766.23

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.
(3) Not sampled.

TABLE 2

WELL PURGING DATA SUMMARY
GROUNDWATER SAMPLING EVENT
CEDARTOWN MUNICIPAL LANDFILL SITE
SEPTEMBER 1997

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (μS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	778.68	2.7	1	3	7.4	501	72	41	Bladder pump
			2	6	7.3	463	69	9	
			3	9	7.1	480	70	7	
OW-2	773.94	1	1	1	7.2	592	65	27	Bladder pump
			2	2	7.1	589	65	13	
			3	3	7.1	580	65	12	
OW-3	766.51	21.4	1	22	6.9	415	70	16	Bladder pump
			2	44	7.2	422	69	1.6	
			3	66	7.5	431	68	2	
OW-4	765.65	4.2	1	4.5	7.6	1378	70	18.4	Bladder pump
			2	9	7.4	1256	70	8.4	
			3	13.5	7.2	1199	67	8.4	
			4	18	7	1186	69	7.8	
OW-5	780.11	10.8	1	10	5.9	375	70	-	Bladder pump
			2	20	6.9	350	67	8	
			3	30	7.4	356	70	6	
			4	40	7.4	360	69	5	
OW-6B	782.17	61	1	65	6	214	64	55	Airlift pump
			2	130	5.9	211	63	55	
			3	200	6.6	208	63	47	

TABLE 2

WELL PURGING DATA SUMMARY
GROUNDWATER SAMPLING EVENT
CEDARTOWN MUNICIPAL LANDFILL SITE
SEPTEMBER 1997

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-7R	785.88	9.7	1	10	8.1	49	76	14.3	Bladder pump
			2	20	8.1	43	73	8.1	
			3	30	7.8	38	70	3.2	
CL-03-WP	783.72	7.9	1	8	7.5	319	69	13.6	Bladder pump
			2	16	7.4	338	70	11.7	
			3	24	7.9	337	68	7.5	
CL-04-WP(5)	757.18	0.2	-	-	-	-	-	-	Bladder pump
CL-05-WP	780.04	6.9	1	7	7.6	590	70	26	Bladder pump
			2	14	7.7	595	70	28	
			3	21	7.5	580	70	13	
CL-06-WP(5)	772.93	0.1	-	-	-	-	-	-	Bladder pump
CL-07-WP(5)	799.25	1.1	-	-	-	-	-	-	Bladder pump
CL-09-WP	766.23	2.5	1	2.5	5.8	333	74	1.1	Peristaltic pump
			2	5	6.2	328	70	2	
			3	7.5	5.9	329	69	2	

Notes:

(1) Elevations are feet above mean sea level.

(2) micromhos

(3) Degrees Fahrenheit

3482-M-6-T2

TABLE 2

WELL PURGING DATA SUMMARY
GROUNDWATER SAMPLING EVENT
CEDARTOWN MUNICIPAL LANDFILL SITE
SEPTEMBER 1997

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*

(4) Nephelometric units

(5) Well was purged dry and did not recover sufficiently to sample

-- - No measurement taken.

TABLE 3

SAMPLE KEY
GROUNDWATER SAMPLING EVENT
CEDARTOWN MUNICIPAL LANDFILL SITE
SEPTEMBER 1997

Sample Number	*Source*	*Turbidity (NTUs) (1)*	*Parameters*	*Method*	*Comments*
GW-3482-090997--JOS-01	OW-2	12	(2)	(3)	GW-3482-090997-JOS-04 (duplicate)
GW-3482-090997-JOS-02	CL-09-WP	2	(2)	(4)	
GW-3482-090997-JOS-03	OW-5	5	(2)	(3)	
GW-3482-090997-JOS-05	CL-03-WP	7.5	(2)	(3)	
GW-3482-090997-JOS-06	OW-1	7	(2)	(3)	
GW-3482-090997-JOS-007	OW-4	7.8	(2)	(3)	
GW-3482-090997-JOS-08	CL-05-WP	13	(2)	(3)	
GW-3482-091097-JOS-09	-	-	(2)	-	Rinsate blank prior to use in OW-3
GW-3482-091097-JOS-10	OW-6B	47	(2)	(5)	
GW-3482-091097-JOS-11	OW-3	2	(2)	(3)	
GW-3482-091097-JOS-12MS/MSD	OW-7R	3.2	(2)	(3)	

Notes:

(1) Nephelometric units.

(2) Beryllium, cadmium, chromium, lead, manganese, chloride, sodium, sulfate, vanadium, and zinc.

(3) Bladder pump.

(4) Peristaltic pump.

(5) Teflon bailer

APPENDIX G

LABORATORY ANALYTICAL REPORTS AND DATA VALIDATION AND ASSESSMENT MEMORANDA

Quanterra Environmental Services

Quanterra Incorporated
4101 Shuffel Drive NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright

Daniel J. Wright
Project Manager

February 7, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for seven water samples submitted to Quanterra-North Canton by Conestoga-Rovers and Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received January 9, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on January 16, 1995. A summary of QC data for these analyses is included at the end of the report.

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Aluminum	SW846 6010A
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Copper	SW846 6010A
Manganese	SW846 6010A
Nickel	SW846 6010A
Zinc	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, September, 1986 and subsequent revisions

Quanterra
Environmental
Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION		
A266T	A5A090036-001	W-3482-JOS-010595-01	1-5-95	1615
A266V	A5A090036-002	W-3482-JOS-010595-02	1-5-95	1700
A266W	A5A090036-003	W-3482-JOS-010695-03	1-6-95	1000
A266X	A5A090036-004	W-3482-JOS-010695-04	1-6-95	1200
A2671	A5A090036-005	W-3482-JOS-010695-05	1-6-95	1300
A2672	A5A090036-006	W-3482-JOS-010695-06	1-6-95	1430
A2674	A5A090036-007	W-3482-JOS-010695-07	1-6-95	1500

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010595-01 1-5-95 1615

#: A266T
B #: A5A090036-001
' .IX: WATER

DATE SAMPLED: 1/05/95
DATE RECEIVED: 1/09/95

- REQUESTED METALS -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
: /ilium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
. nium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
:romium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
ı ganese	587	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
ead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020

: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010595-02 1-5-95 1700

#: A266V
#: ASA090036-002
RIX: WATER

DATE SAMPLED: 1/05/95
DATE RECEIVED: 1/09/95

REQUESTED METALS

AMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
imium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
romium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
nganese	45.1	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
ad	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102.

TE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010695-03 1-6-95 1000

) #: A266W
AB #: A5A090036-003
A RIX: WATER

DATE SAMPLED: 1/06/95
DATE RECEIVED: 1/09/95

- REQUESTED METALS -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
e yllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
a mium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102:
hromium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
M ganese	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102'
.ead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102

« F: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-011095-09 (MS/MSD) 1-10-95 1200

#: A27HL
#: ASA120021-002
RIX: WATER

DATE SAMPLED: 1/10/95
DATE RECEIVED: 1/12/95

REQUESTED METALS

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ryllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
dmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
romium	ND	10.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
nganese	2.830	10.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
ad	ND	3.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018

T AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010695-05 1-6-95 1300

#: A2671
#: A5A090036-005
F X: WATER

DATE SAMPLED: 1/06/95
DATE RECEIVED: 1/09/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS -

AMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
- .llium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
1 .um	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
romium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
) anese	2,270	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
au	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020

AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

W-3482-JOS-010695-06 1-6-95 1430

#: A2672
B #: A5A090036-006
TRIX: WATER

DATE SAMPLED: 1/06/95
DATE RECEIVED: 1/09/95

- REQUESTED METALS -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
eryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
admium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
hromium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
anganese	10.8	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
ead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(

OTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JCS-010695-07 1-6-95 1500

#: A2674		DATE SAMPLED:	1/06/95
B #: A5A090036-007		DATE RECEIVED:	1/09/95
IX: WATER			

- REQUESTED METALS -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
e yllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
mium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
romium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
ganese	14.4	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
ead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020

E: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

QUALITY CONTROL SECTION

Quanterra
Environmental
Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental
Services

CHECK SAMPLE REPORT

#: A5A090036

METALS

1POUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:S011020		
ryllium	102	(80-118)	1/11- 1/12/95
dmium	100	(80-108)	1/11- 1/12/95
romium	100	(83-114)	1/11- 1/12/95
nganese	102	(81-112)	1/11- 1/12/95
ad	98	(80-120)	1/11- 1/12/95

Quanterra
Environmental
Services

INTRA-LAB BLANK REPORT

J #: A5A090036

METALS

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION ANALYSIS DATE
		BATCH:5011020			
eryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/9
dmium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/9
romium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/9
nganese	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/9
ad	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/9

E:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

MATRIX SPIKE REPORT

AB #: A4L220064-001

- - - - - - - - - - - - - - - - - - METALS -

OMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION ANALYSIS DAT
	BATCH:5003045 MATRIX: WATER					
ilver	95	98	(61-126)	3.3	(0-20)	1/03- 1/04/9
luminum	102	107	(56-147)	5.2	(0-20)	1/03- 1/04/9
rsenic	96	97	(80-120)	1.3	(0-20)	1/03- 1/04/9
arium	97	100	(79-116)	2.5	(0-20)	1/03- 1/04/9
eryllium	99	103	(76-117)	4.2	(0-20)	1/03- 1/04/9
admium	91	96	(70-109)	5.8	(0-20)	1/03- 1/04/9
romium	95	100	(74-117)	5.0	(0-20)	1/03- 1/04/9
opper	95	98	(77-112)	2.7	(0-20)	1/03- 1/04/9
Iron	100	110	(45-146)	9.3	(0-20)	1/03- 1/04/9
ercury	90	87	(31-160)	3.4	(0-20)	1/03/95
Manganese	104	121	(57-131)	15	(0-20)	1/03- 1/04/9
Sodium	105	103	(40-144)	1.7	(0-20)	1/03- 1/04/9
Nickel	93	98	(73-109)	5.4	(0-20)	1/03- 1/04/9
Lead	88	92	(72-114)	4.6	(0-20)	1/03- 1/04/9
Antimony	89	93	(73-112)	4.0	(0-20)	1/03- 1/04/9
Selenium	94	94	(80-120)	0.32	(0-20)	1/03- 1/04/9
Thallium	91	92	(80-120)	1.1	(0-20)	1/03- 1/04/9
	95	100	(67-118)	5.1	(0-20)	1/03- 1/04/9

NOTE:

. are performed before rounding to avoid round-off errors in calculated results

![Quanterra Environmental Services logo]

Quanterra
Environmental
Services

MATRIX SPIKE REPORT

B #: A4L300002-001

* DISSOLVED METALS ***

- METALS -

OUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATI
	BATCH:5005026 MATRIX: WATER					
lver	101	99	(61-126)	2.6	0-20)	1/05- 1/08/9
nic	110	108	(80-120)	2.0	(0-20)	1/05- 1/08/9
a ium	105	102	(79-116)	2.6	(0-20)	1/05- 1/08/9
eryllium	111	108	(76-117)	2.7	(0-20)	1/05- 1/08/9
a cium	108	115	40-146)	6.1	(0-20)	1/05- 1/08/9
a nium	103	101	(70-109)	2.3	(0-20)	1/05- 1/08/9
obalt	103	100	(75-110)	2.4	(0-20)	1/05- 1/08/9
hromium	104	101	(74-117)	2.4	(0-20)	1/05- 1/08/9
per	102	99	(77-112)	2.8	(0-20)	1/05- 1/08/9
cury	115	116	(31-160)	0.60	(0-20)	1/05- 1/07/9
otassium	116	113	(67-123)	2.8	0-20)	1/05- 1/08/9
nesium	102	103	(71-112)	0.73	(0-20)	1/05- 1/08/9
anese	106	104	(57-131)	2.1	(0-20)	1/05- 1/08/9
o um	105	98	(40-144)	7.0	(0-20)	1/05- 1/12/9
ickel	103	101	(73-109)	2.0	(0-20)	1/05- 1/08/9
d	103	101	(80-120)	2.5	(0-20)	1/05- 1/08/9
imony	101	99	(73-112)	2.3	(0-20)	1/05- 1/08/9
elenium	107	104	(80-120)	2.4	(0-20)	1/05- 1/08/9
[illegible]	113	101	(73-123)	12	0-20)	1/05- 1/16/9
nadium	103	100	(79-112)	2.7	(0-20)	1/05- 1/08/9
inc	110	108	67-118)	[illegible]	0-20)	1/05- 1.08/9
	BATCH:5011024 MATRIX: WATER					
on	104	110	(45-146)	6.2	(0-20)	1/11- 1/16/9
Potassium	0	0	(67-123)	0	0-10) -	1/11- 0/00/0

HE CORRECTIVE ACTION CRITERIA IS BASED UPON THE ABSOLUTE DIFFERENCE OF THE MATRIX AND MATRIX SPIKE DUPLICATE RECOVERIES.

ns are performed before rounding to avoid round-off errors in calculated results

Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE [illegible signature]

PRINTED NAME [illegible]

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	PARAMETERS					REMARKS
	1-5-95	[illegible]	W-3452 [illegible]	[illegible]	1	X	X	X	X	X	
	1-5-95	[illegible]	W 3452 [illegible]	[illegible]	1						
	1-6-95	[illegible]	W 3452 [illegible]	[illegible]	1						
	1-6-95	1200	W 3452 [illegible] 4	[illegible]	1						
	1-6-95	[illegible]	W 3452 [illegible]	[illegible]	1						
	1-6-95	1430	W 3452 [illegible]	[illegible]	1						
	1-6-95	[illegible]	W 3452 [illegible]	[illegible]	1						

TOTAL NUMBER OF CONTAINERS 7

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME
① [illegible signature]	DATE: 1-5-[illegible] TIME: [illegible]	②	DATE: TIME:
②	DATE: TIME:	③	DATE: TIME:
③	DATE: TIME:	④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX

AIR BILL NUMBER: 2487611574

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: John Schwalle; Dave Grytnski

RECEIVED FOR LABORATORY BY: Kris McBrooks

DATE: 1-9-95 TIME: 11:30a

№ 0045

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
A2EJW	A5A250014-001	W-3482-JOS-012395-15 1-23-95 1730

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-012395-15 1-23-95 1730

) #: A2EJW
.B #: A5A250014-001
.TRIX: WATER

DATE SAMPLED: 1/23/95
DATE RECEIVED: 1/25/95

- REQUESTED METALS -

.RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
eryllium	ND	5.0	ug/L	SW846 6010A	1/25- 1/30/95	5025088
admium	ND	5.0	ug/L	SW846 6010A	1/25- 1/30/95	5025088
hromium	10.1	10.0	ug/L	SW846 6010A	1/25- 1/30/95	5025088
anganese	491	10.0	ug/L	SW846 6010A	1/25- 2/01/95	5025088
ead	11.0	5.0	ug/L	SW846 6010A	1/25- 1/30/95	5025088

OTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

PROJECT NARRATIVE

The following report contains the analytical results for one water sample submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The sample was received January 25, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The sample presented in this report was analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to Joanne Staubitz and John Schwaller on February 3, 1995. A summary of QC data for this analysis is included at the end of the report.

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Manganese	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods". Third Edition, September, 1986 and subsequent revisions

..51 ...brc ...rive Su... 150
Norcross, GA ..093 404-441-0027

CHAIN OF CUSTODY RECORD

...REN... ...IMBE... 3482

...JEC... ...IL... CEDARTOWN MUNICIPAL LANDFILL

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: John Schwaller

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese	Aluminum	Copper	Nickel	Zinc	REMARKS
	1/5/95	1600	W-3482-JDS-010995-08	G.W.	1	6	x	x	x	x					all w/ Nitric
	1/10/95	1200	W-3482-JDS-011095-09MS/MSD	GW	2	x	x	x	x	x					
	1/10/95	1700	W-3482-JDS-011095-10	GW	1	x	x	x	x	x					
	1/10/95	1800	W-3482-JDS-011095-11	GW	1	x	x	x	x	x					
	1/11/95	0930	W-3482-JDS-011195-12	GW	1	x	x	x	x	x					
	1/11/95	1030	SW-3482-JDS-011195-13	GW	1			x			x	x	x	x	
	1/11/95	1100	W-3482-JDS-011195-14	GW	1	x	x	x	x	x					

TOTAL NUMBER OF CONTAINERS: 8

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	DATE / TIME
① [signature]	DATE: 1/11/95 TIME: 1600	②	DATE: TIME:
②	DATE: TIME:	③	DATE: TIME:
③	DATE: TIME:	④	DATE: TIME:

METHOD OF SHIPMENT: FED EX O/N

AIR BILL NUMBER: 3482597694

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM:
John Schwaller
Dave Brytowski

RECEIVED FOR LABORATORY BY: Kathie Graves

№ 00454

DATE: 950112 TIME: 10:20am

Quanterra
Environmental
Services

nterra Incorporated
' Shuffel Drive, NW
Canton, Ohio 44720

497 9396 Telephone
497 3772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC., LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

January 18, 1995

INTRA-LAB BLANK REPORT

-SA120021

- METALS -

TER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5013018			
:um	ND	200	ug/L	SW846 6010A	1/13- 1/24/95
-ium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95
1	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95
um	ND	10.0	ug/L	SW846 6010A	1/13- 1/24/95
	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95
nese	ND	10.0	ug/L	SW846 6010A	1/13- 1/24/95
:	ND	40.0	ug/L	SW846 6010A	1/13- 1/25/95
	ND	3.0	ug/L	SW846 6010A	1/13- 1/24/95
	ND	20.0	ug/L	SW846 6010A	1/13- 1/23/95

ND NOT DETECTED AT THE STATED REPORTING LIMIT

MATRIX SPIKE REPORT

#: A5A120021-002

- - - - - - - - - - - - - - - - - METALS -

[illegible]POUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5013018 MATRIX: WATER					
[illegible]yllium	96	96	(76-117)	0.27	(0-20)	1/13- 1/24/95
[illegible]mium	95	94	(70-109)	0.16	(0-20)	1/13- 1/24/95
[illegible]mium	95	95	(74-117)	0	(0-20)	1/13- 1/24/95
[illegible]anese	98	105	(57-131)	[illegible].6	(0-20)	1/13- 1/24/95
[illegible]ad	92	93	(80-120)	0.050	(0-20)	1/13- 1/24/95

[illegible]

[illegible]s are performed before rounding to avoid round-off errors in calculated results

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

CHECK SAMPLE REPORT

#: A5A120021

- METALS -

MPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5013018		
uminum	90	(86-121)	1/13- 1/24/95
ryllium	97	(80-113)	1/13- 1/24/95
dmium	96	(80-108)	1/13- 1/24/95
romium	96	(83-114)	1/13- 1/24/95
pper	92	(84-110)	1/13- 1/24/95
nganese	98	(81-112)	1/13- 1/24/95
ckel	91	(81-110)	1/13- 1/25/95
ad	93	(80-120)	1/13- 1/24/95
nc	91	(79-112)	1/13- 1/23/95

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010695-04 1-6-95 1200

#: A266X
#: ASA090036-004
RIX: WATER

DATE SAMPLED: 1/06/95
DATE RECEIVED: 1/09/95

REQUESTED METALS

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
dmium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102(
romium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102.
nganese	2,290	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102'
ad	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102

OTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

QUALITY CONTROL SECTION

CONESTOGA-ROVERS & ASSOC., LTD.

W-3482-JOS-011195-12 1-11-95 0930

#: A27HV
3 #: A5A120021-005
I IX: WATER

DATE SAMPLED: 1/11/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
.yllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
dmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
.romium	ND	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
.nganese	67.6	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
ıad	4.4	3.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018

)' AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-011195-13 1-11-95 1030

: A27HX
#: A5A120021-006
IX: WATER

DATE SAMPLED: 1/11/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - REQUESTED METALS -

METER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ınum	ND	200	ug/L	SW846 6010A	1/13- 1/25/95	5013018
mium	ND	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
er	17.8	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
el	ND	40.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
:	ND	20.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
i	ND	3.00	ug/L	SW846 6010A	1/13- 1/25/95	5013018

AS RECEIVED
NOT DETECTED AT THE STATED REPORTING LIMIT

CONESTOGA-ROVERS & ASSOC., LTD.

W-3482-JOS-011095-10 1-10-95 1700

WO #: A27HQ
L S #: A5A120021-003
MATRIX: WATER

DATE SAMPLED: 1/10/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Cadmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Chromium	ND	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Manganese	114	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Lead	ND	3.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-011095-11 1-10-95 1800

: A27HR	DATE SAMPLED: 1/10/95
#: A5A120021-004	DATE RECEIVED: 1/12/95
RIX: WATER	

- - - - - - - - - - - - - - - - - - REQUESTED METALS -

AMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
yllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
mium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
omium	ND	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
ganese	1,270	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
d	ND	3.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018

E AS RECEIVED

D NOT DETECTED AT THE STATED REPORTING LIMIT

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010995-08 1-9-95 1600

#: A27HG
B #: A5A120021-001
IX: WATER

DATE SAMPLED: 1/09/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
e illium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
admium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
hromium	ND	10.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
anganese	19.2	10.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
ead	ND	3.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018

AS RECEIVED

ND NOT DETECTED AT THE STATED REPORTING LIMIT

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-011195-14 1-11-95 1100

#: A27J1
| #: ASA120021-007
..IX: WATER

DATE SAMPLED: 1/11/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
r_llium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
dmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
r-mium	423	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
nganese	662	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
ad	ND	3.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018

E AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Manganese	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods". Third Edition, September, 1986 and subsequent revisions

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
A27HG	A5A120021-001	W-3482-JOS-010995-08 1-9-95 1600
A27HL	A5A120021-002	W-3482-JOS-011095-09 (MS/MSD) 1-10-95 1200
A27HQ	A5A120021-003	W-3482-JOS-011095-10 1-10-95 1700
A27HR	A5A120021-004	W-3482-JOS-011095-11 1-10-95 1800
A27HV	A5A120021-005	W-3482-JOS-011195-12 1-11-95 0930
A27HX	A5A120021-006	SW-3482-JOS-011195-13 1-11-95 1030
A27J1	A5A120021-007	W-3482-JOS-011195-14 1-11-95 1100

Quanterra
Environmental Services

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-[illegible] Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC., LTD.

QUANTERRA INCORPORATED

Daniel J. Wright

Daniel J. Wright
Project Manager

February 7, 1995

PROJECT NARRATIVE

The following report contains the analytical results for seven water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received January 12, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. A summary of QC data for these analyses is included at the end of the report.

QUALITY CONTROL SECTION

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

"DIL" in the Quality Control Section means that due to high analyte concentration in the sample, the matrix spiking analytes added to the sample are diluted out and cannot be quantitated.

CHECK SAMPLE REPORT

LAB #: A5A250014

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5025088		
Beryllium	99	(80-118)	1/25- 1/26/95
Cadmium	90	(80-108)	1/25- 1/26/95
Chromium	91	(83-114)	1/25- 1/26/95
Manganese	93	(81-112)	1/25- 1/26/95
Lead	91	(80-120)	1/25- 1/26/95

INTRA-LAB BLANK REPORT

#: A5A250014

METALS

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5025088			
ryllium	ND	5.0	ug/L	SW846 6010A	1/25- 1/26/95
dmium	ND	5.0	ug/L	SW846 6010A	1/25- 1/26/95
romium	ND	10.0	ug/L	SW846 6010A	1/25- 1/26/95
nganese	ND	10.0	ug/L	SW846 6010A	1/25- 1/26/95
ad	ND	5.0	ug/L	SW846 6010A	1/25- 1/30/95

TE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

MATRIX SPIKE REPORT

LAB #: A5A130076-001

METALS

COMPOUND		SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:5014008 MATRIX: WATER					
Silver		97	93	(61-126)	3.6	(0-20)	1/14- 1/24/95
Arsenic		98	95	(80-120)	3.4	(0-20)	1/14- 1/24/95
Barium		98	95	(79-116)	3.5	(0-20)	1/14- 1/24/95
Berylilium		106	102	(76-117)	3.4	(0-20)	1/14- 1/24/95
Calcium	DIL						1/14- 1/24/95
Cadmium		98	94	(70-109)	3.5	(0-20)	1/14- 1/24/95
Cobalt		98	94	(75-110)	3.6	(0-20)	1/14- 1/24/95
Chromium		98	94	(74-117)	3.8	(0-20)	1/14- 1/24/95
Iron		86	71	(45-146)	20	(0-20)	1/14- 1/24/95
Mercury		120	119	(31-160)	0.92	(0-20)	1/14- 1/16/95
Potassium		123	117	(67-123)	4.5	(0-20)	1/14- 1/24/95
Magnesium		106	94	(71-112)	12	(0-20)	1/14- 1/24/95
anganese		102	94	(57-131)	7.6	(0-20)	1/14- 1/24/95
Sodium		108	99	(40-144)	8.5	(0-20)	1/14- 1/25/95
Nickel		91	88	(73-109)	3.6	(0-20)	1/14- 1/25/95
Lead		98	94	(80-120)	3.7	(0-20)	1/14- 1/24/95
Antimony		97	94	(73-112)	3.1	(0-20)	1/14- 1/24/95
Selenium		98	94	(80-120)	3.2	(0-20)	1/14- 1/24/95
Thallium		189	184	(80-120)	2.8	(0-20)	1/14- 1/24/95
Vanadium		98	94	(79-112)	3.7	(0-20)	1/14- 1/24/95
Zinc		104	100	(67-118)	3.8	(0-20)	1/14- 1/24/95
		BATCH:5019048 MATRIX: WATER					
Copper		88	83	(77-112)	5.8	(0-20)	1/19- 1/20/95
Tin		87	84	(73-123)	3.3	(0-20)	1/19- 1/20/95

NOTE:

Diluted out

ulations are performed before rounding to avoid round-off errors in calculated results

METALS SPIKE REPORT

WATER - ICP

-METALS-

OMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
ilver	101	99	(61-126)	2	(0-20)	1/05-1/08/95	A23R
luminum	112	108	(56-147)	4	(0-20)	1/03-1/09/95	A23C
rsenic	110	108	(51-146)	2	(0-20)	1/05-1/08/95	A23R
oron	93	100	(73-110)	7	(0-20)	1/10-1/17/95	A23C
arium	105	102	(79-116)	3	(0-20)	1/05-1/08/95	A23R
eryllium	111	108	(76-117)	3	(0-20)	1/05-1/08/95	A23R
alcium	103	115	(40-146)	6	(0-20)	1/05-1/08/95	A23R
admium	103	101	(70-109)	2	(0-20)	1/05-1/08/95	A23R
obalt	103	100	(75-110)	3	(0-20)	1/05-1/08/95	A23R
hromium	104	101	(74-117)	3	(0-20)	1/05-1/08/95	A23R
opper	102	99	(77-112)	3	(0-20)	1/05-1/08/95	A23R
ron	96	95	(45-146)	1	(0-20)	1/03-1/09/95	A23R
assium	116	113	(67-123)	3	(0-20)	1/05-1/08/95	A23R
Magnesium	102	103	(71-112)	1	(0-20)	1/05-1/08/95	A23R
Manganese	106	104	(57-131)	2	(0-20)	1/05-1/08/95	A23R
Molybdenum	111	106	(90-114)	5	(0-20)	1/03-1/09/95	A23C
Sodium	105	98	(40-144)	7	(0-20)	1/05-1/12/95	A23R
Nickel	103	101	(73-109)	2	(0-20)	1/05-1/08/95	A23R
Lead	103	101	(72-114)	2	(0-20)	1/05-1/08/95	A23R
Antimony	101	99	(73-112)	2	(0-20)	1/05-1/08/95	A23R
Selenium	107	104	(30-175)	3	(0-20)	1/05-1/08/95	A23R
Tin	113	101	(73-123)	11	(0-20)	1/05-1/08/95	A23R
Strontium	105	101	(83-112)	4	(0-20)	12/27-12/28/94	A1TH
Titanium	102	103	(80-111)	1	(0-20)	1/20-1/21/93	B218
Thallium	94	99	(57-121)	5	(0-20)	1/03-1/09/95	A23C
Tungsten	99	109	(72-112)	10	(0-20)	9/07-9/08/93	F378
Vanadium	103	100	(79-112)	3	(0-20)	1/05-1/08/95	A23R
Zinc	110	108	(67-118)	2	(0-20)	1/05-1/08/95	A23R
Osmium	107	111	(80-120)	4	(0-20)	12/22/94-1/03/95	A1T6

Norcross, (...93 104- 1027

CHAIN OF CUSTODY RECORD | 3482

SAMPLER'S SIGNATURE: [illegible] PRINTED NAME: John Schwalker

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese					REMARKS
	1/23/95	1730	W-3482-JJS-012395-15	G.W.	1	x	x	x	x	x					w/ NITRIC

TOTAL NUMBER OF CONTAINERS 1

RELINQUISHED BY: ① [illegible signature]	DATE: 1/24/95 TIME: 0500	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED EX O/N

AIR BILL NUMBER: 3482597683

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: John Schwalker

RECEIVED FOR LABORATORY BY: Kathy Graves

DATE: 950125 TIME: 9:50am

№ 00456

Quanterra

Environmental Services

Quanterra Incorporated
?01 Shuffel Drive NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

Rec'd CRA

MAY 1995

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC., LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

May 5, 1995

Quanterra
Environmental
Services

PROJECT NARRATIVE

The following report contains the analytical results for eight water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received April 27, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to JoAnne Staupitz on May 4, 1995. A summary of QC data for these analyses is included at the end of the report.

Quanterra
Environmental
Services

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Manganese	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" Third Edition, September, 1986 and subsequent revisions

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION	
A47MP	A5D270017-001	GW-3482-JOS-042595-016	(MS/MSD)
A47MR	A5D270017-002	GW-3482-JOS-042595-017	
A47MV	A5D270017-003	GW-3482-JOS-042595-018	
A47MW	A5D270017-004	GW-3482-JOS-042595-019	
A47N0	A5D270017-005	GW-3482-JOS-042595-020	
A47N2	A5D270017-006	GW-3482-JOS-042695-021	
A47N3	A5D270017-007	GW-3482-JOS-042695-022	
A47N5	A5D270017-008	GW-3482-JOS-042695-024	

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042595-016 (MS/MSD)

WO #: A47MP
LAB #: A5D270017-001
MATRIX: WATER

DATE SAMPLED: 4/25/95
DATE RECEIVED: 4/27/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042595-017

D #: A47MR
AB #: A5D270017-002
ATRIX: WATER

DATE SAMPLED: 4/25/95
DATE RECEIVED: 4/27/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
eryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
admium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
hromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
anganese	80.2	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
ead	5.0	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042595-018

WO #: A47MV
LAB #: A5D270017-003
MATRIX: WATER

DATE SAMPLED: 4/25/95
DATE RECEIVED: 4/27/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Manganese	83.6	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Lead	4.8	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

TE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042595-019

WO #: A47MW
LAB #: A5D270017-004
MATRIX: WATER

DATE SAMPLED: 4/25/95
DATE RECEIVED: 4/27/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Manganese	5,060	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042595-020

WO #: A47N0
LAB #: ASD270017-005
MATRIX: WATER

DATE SAMPLED: 4/25/95
DATE RECEIVED: 4/27/95

\- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-042695-021

'O #: A47N2	DATE SAMPLED: 4/26/95
.AB #: A5D270017-006	DATE RECEIVED: 4/27/95
IATRIX: WATER	

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042695-022

WO #: A47N3
LAB #: A5D270017-007
MATRIX: WATER

DATE SAMPLED: 4/26/95
DATE RECEIVED: 4/27/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

* AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042695-024

WO #: A47N5
LAB #: A5D270017-008
MATRIX: WATER

DATE SAMPLED: 4/26/95
DATE RECEIVED: 4/27/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Manganese	4,890	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental
Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant.

Quanterra
Environmental
Services

CHECK SAMPLE REPORT

LAB #: A5D270017

METALS

MPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5121006		
rylilium	112	(80-118)	5/01- 5/02/95
dmium	107	(80-108)	5/01- 5/02/95
hromium	105	(83-114)	5/01- 5/02/95
nganese	105	(81-112)	5/01- 5/02/95
ad	99	(80-120)	5/01- 5/02/95

Quanterra
Environmental
Services

INTRA-LAB BLANK REPORT

LAB #: ASD270017

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5121006			
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

MATRIX SPIKE REPORT

LAB #: A5D270017-001

METALS

MPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:5121006 MATRIX: WATER				
ryllium	107	109	(76-117)	1.8	(0-20)	5/01- 5/02/95
adm ium	107	108	(70-109)	1.4	(0-20)	5/01- 5/02/95
hromium	106	107	(74-117)	1.5	(0-20)	5/01- 5/02/95
nganese	106	108	(57-131)	1.7	(0-20)	5/01- 5/02/95
ad	100	102	(80-120)	1.7	(0-20)	5/01- 5/02/95

OTE:

ulations are performed before rounding to avoid round-off errors in calculated results

CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive
Suite 150
Norcross, GA 30093
404-441-0027

CHAIN OF CUSTODY RECORD

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese					REMARKS
	4/25/95	1130	GW-3482-JOS-042595-016	GW	1	X	X	X	X	X					Preserved w/ HNO_3 -
		1730	GW-3482-JOS-042595-017		1										
		1700	GW-3482-JOS-042595-018		1										
		1530	GW-3482-JOS-042595-019		1										
		1800	GW-3482-JOS-042595-020		1										
	4/26/95	1500	GW-3482-JOS-042695-021		1										
		1530	GW-3482-JOS-042695-022		1										
		1800	GW-3482-JOS-042695-024		1										

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: ① [signature]	DATE: 4/26/95 TIME: 1300	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 5202184341

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER, DAVID BRYTOWSKI

RECEIVED FOR LABORATORY BY: [signature]

DATE: 950427 TIME: 9 45am

00616

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

Quanterra
Environmental
Services

RECD CRA

MAY 19 1995

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC., LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

May 18, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for four water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received May 1, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to Joanne Staupitz on May 15, 1995. A summary of QC data for these analyses is included at the end of the report.

Quanterra
Environmental
Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
A4A9Q	A5E020030-001	GW-3482-JOS-042795-026
A4A9R	A5E020030-002	GW-3482-JOS-042895-023
A4A9T	A5E020030-003	GW-3482-JOS-042895-002
A4A9V	A5E020030-004	GW-3482-JOS-042895-027

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
A4A9Q	A5E020030-001	GW-3482-JCS-042795-026
A4A9R	A5E020030-002	GW-3482-JCS-042895-023
A4A9T	A5E020030-003	GW-3482-JCS-042895-002
A4A9V	A5E020030-004	GW-3482-JCS-042895-027

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042795-026

WO #: A4A9Q
LAB #: A5E020030-001
MATRIX: WATER

DATE SAMPLED: 4/27/95
DATE RECEIVED: 5/01/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/08- 5/12/95	5128079
Cadmium	ND	5.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Chromium	173	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Manganese	888	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Lead	4.6	3.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042895-023

WO #: A4A9R
LAB #: A5E020030-002
MATRIX: WATER

DATE SAMPLED: 4/28/95
DATE RECEIVED: 5/01/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/08- 5/12/95	5128079
Cadmium	ND	5.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Chromium	ND	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Manganese	202	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
[illegible]	ND	3.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

SW-3482-JOS-042895-002

IO #: A4A9T
LAB #: A5E020030-003
MATRIX: WATER

DATE SAMPLED: 4/28/95
DATE RECEIVED: 5/01/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Aluminum	ND	200	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Chromium	ND	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Copper	ND	5.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Nickel	ND	40.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Zinc	ND	20.0	ug/L	SW846 6010A	5/08- 5/12/95	5128079
Lead	ND	3.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042895-027

WO #: A4A9V
LAB #: A5E020030-004
MATRIX: WATER

DATE SAMPLED: 4/28/95
DATE RECEIVED: 5/01/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/08- 5/12/95	5128079
Cadmium	ND	5.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Chromium	ND	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Manganese	2,460	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
[illegible]	ND	[illegible]	ug/L	SW846 6010A	5/08- 5/11/95	5128079

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental
Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental
Services

CHECK SAMPLE REPORT

LAB #: A5E020030

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5128079		
Aluminum	100	(86-121)	5/08- 5/10/95
Beryllium	108	(80-113)	5/08- 5/10/95
Cadmium	96	(80-108)	5/08- 5/12/95
Chromium	114	(83-114)	5/08- 5/10/95
Copper	104	(84-110)	5/08- 5/11/95
Manganese	101	(81-112)	5/08- 5/12/95
Nickel	106	(81-110)	5/08- 5/11/95
Lead	101	(80-120)	5/08- 5/11/95
Zinc	98	(79-112)	5/08- 5/12/95

Quanterra
Environmental
Services

INTRA-LAB BLANK REPORT

LAB #: A5E020030

- METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5128079			
Aluminum	ND	200	ug/L	SW846 6010A	5/08- 5/10/95
Beryllium	ND	5.0	ug/L	SW846 6010A	5/08- 5/10/95
Cadmium	ND	5.0	ug/L	SW846 6010A	5/08- 5/11/95
Chromium	ND	10.0	ug/L	SW846 6010A	5/08- 5/11/95
Copper	ND	5.0	ug/L	SW846 6010A	5/08- 5/11/95
Manganese	ND	10.0	ug/L	SW846 6010A	5/08- 5/10/95
Nickel	ND	40.0	ug/L	SW846 6010A	5/08- 5/10/95
Lead	ND	3.0	ug/L	SW846 6010A	5/08- 5/11/95
Zinc	ND	20.0	ug/L	SW846 6010A	5/08- 5/11/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

MATRIX SPIKE REPORT

LAB #: ASE020030-001

METALS

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:5128079 MATRIX: WATER				
Beryllium	95	99	(76-117)	4.2	(0-20)	5/08- 5/12/95
Cadmium	98	100	(70-109)	1.3	(0-20)	5/08- 5/11/95
Chromium	98	101	(74-117)	3.8	(0-20)	5/08- 5/11/95
Manganese	97	108	(57-131)	10	(0-20)	5/08- 5/11/95
Lead	94	97	(80-120)	2.1	(0-20)	5/08- 5/11/95

NOTE:

Calculations are performed before rounding to avoid round-off errors in calculated results

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese	Aluminum	Copper	Nickel	Zinc	REMARKS
	4/27/95	1145	GW-3482-JS-042795-025	GW	1	X	X	X	X	X					*LEVEL IV DATA PACKAGE
	4/27/95	1550	GW-3482-JS-042795-026	↓	1	↓	↓	↓	↓	↓					
	4/28/95	1200	GW-3482-JS-042895-023	↓	1	↓	↓	↓	↓	↓					
	4/28/95	1030	SW-3482-JS-042895-002	SW	1			X	X		X	X	X	X	
	4/28/95	1230	GW-3482-JS-042895-027	GW	1	X	X	X	X	X					

TOTAL NUMBER OF CONTAINERS: 5

RELINQUISHED BY: ① [signature]	DATE: 4/28/95 TIME: 1600	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: Fed-Ex O/N

AIR BILL NUMBER: 5202184352

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy

SAMPLE TEAM: John Schwaller

RECEIVED FOR LABORATORY BY: [signature]

00459

Quanterra Environmental Services

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC., LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

May 25, 1995

Quanterra
Environmental
Services

PROJECT NARRATIVE

The following report contains the analytical results for three water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received May 3, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. A summary of QC data for these analyses is included at the end of the report.

Quanterra
Environmental
Services

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Manganese	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, September, 1986 and subsequent revisions

Quanterra Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

O #	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED
4C1J	A5E030038-001	GW-3482-JOS-050195-028 (MS/MSD)	5/01/95 16:30
4C1K	A5E030038-002	GW-3482-JOS-050295-029	5/02/95 8:30
4C1L	A5E030038-003	RB-1	5/01/95 11:00

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-0501 95-028 (MS/MSD)

WO #: A4C1J
LAB #: ASE030038-001
MATRIX: WATER

DATE SAMPLED: 5/01/95
TIME SAMPLED: 16:30
DATE RECEIVED: 5/03/95

- - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Cadmium	ND	5.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Chromium	ND	10.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Manganese	3,250	10.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Lead	ND	3.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-050295-029

WO #: A4C1K
LAB #: A5E030038-002
MATRIX: WATER

DATE SAMPLED: 5/02/95
TIME SAMPLED: 8:30
DATE RECEIVED: 5/03/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Cadmium	ND	5.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Chromium	230	10.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Manganese	810	10.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Lead	26.8	3.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

RB-1

WO #: A4C1L
LAB #: A5E030038-003
MATRIX: WATER

DATE SAMPLED: 5/01/95
TIME SAMPLED: 11:00
DATE RECEIVED: 5/03/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Cadmium	ND	5.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Chromium	ND	10.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Manganese	ND	10.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016
Lead	ND	3.0	ug/L	SW846 6010A	5/10- 5/17/95	5130016

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The AD/RPD for the Manganese MS/MSD performed on sample A5E030038-001 was outside laboratory acceptance criteria. Remaining elements spiked from the same spiking solution and from the same prep were within laboratory acceptance criteria. Matrix effect was demonstrated and associated results were accepted.

CHECK SAMPLE REPORT

LAB #: ASE030038

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5130016		
Beryllium	106	(80-118)	5/10- 5/16/95
Cadmium	100	(80-108)	5/10- 5/16/95
Chromium	103	(83-114)	5/10- 5/16/95
Manganese	107	(81-112)	5/10- 5/16/95
[illegible]ad	105	(80-120)	5/10- 5/16/95

Quanterra
Environmental
Services

MATRIX SPIKE REPORT

LAB #: ASE030038-001

METALS

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:5130016 MATRIX: WATER				
Beryllium	99	102	(76-117)	3.4	(0-20)	5/10- 5/17/95
Cadmium	97	100	(70-109)	3.3	(0-20)	5/10- 5/17/95
Chromium	97	100	(74-117)	3.6	(0-20)	5/10- 5/17/95
Manganese	106	133	(57-131)	23	(0-20)	5/10- 5/17/95
Lead	95	98	(80-120)	3.3	(0-20)	5/10- 5/17/95

NOTE:

Calculations are performed before rounding to avoid round-off errors in calculated results

Quanterra Environmental Services

INTRA-LAB BLANK REPORT

LAB #: A5E030038

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5130016			
Beryllium	ND	5.0	ug/L	SW846 6010A	5/10- 5/16/95
Cadmium	ND	5.0	ug/L	SW846 6010A	5/10- 5/19/95
Chromium	ND	10.0	ug/L	SW846 6010A	5/10- 5/19/9
Manganese	ND	10.0	ug/L	SW846 6010A	5/10- 5/16/9
Lead	ND	3.0	ug/L	SW846 6010A	5/10- 5/17/9

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): Quanterra

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: John Schwaller

PARAMETERS: Beryllium, Cadmium, Chromium, Lead, Manganese

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese					REMARKS
	5/1/95	1630	GW-3482-JDS-050195-028 MS/MSD	GW	2	X	X	X	X	X					Preserved w/ HNO_3
	5/2/95	0830	GW-3482-JDS-050295-029	GW	1	✓	✓	✓	✓	✓					✓
	5/1/95	1100	RB-1	W	1	✓	✓	✓	✓	✓					

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: ① [signature]	DATE: 5-2-95 TIME: 1600	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED Ex O/N

AIR BILL NUMBER: 5202184363

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER, D. OKTAWSKI

RECEIVED FOR LABORATORY BY: Kathy J Graves

DATE: 950503 TIME: 1120am

00604

MEMO

TO: Joanne Staubitz

REFERENCE NO: 3482

FROM: Lou Almeida/dm/9

DATE: June 2, 1995

RE: Data Quality Assurance Evaluation
Groundwater Samples
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Thirteen groundwater samples, one surface water sample and one associated quality control sample were collected from the Cedartown Municipal Landfill Site (Site) located in Cedartown, Georgia between April 25, 1995 and April 28, 1995. The groundwater samples were submitted for the analysis of beryllium, ...imium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results obtained by Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were received in reports provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by completed data sheets, blank data, field duplicate results, and recovery data for matrix spike/matrix spike duplicates and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. Sample holding times were determined using sample collection dates noted in the chain-of-custody documents and sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 6 months from the sample collection date to the sample analysis date.

Samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, laboratory method blank samples were analyzed along with the water samples.

Target analytes were not detected in any method blanks, indicating no sample contamination attributable to laboratory conditions. Consequently, no qualifications were necessary on this basis.

2.3 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

Matrix spike (MS) analyses provide insight into sample matrix effects on digestion and/or measurement methodology. Matrix spike duplicate (MSD) analyses provide data with which to assess laboratory precision.

Reported MS/MSD recoveries fell within Contract Document-established control limits (75-125 percent), with one exception. The matrix spike duplicate recovery for manganese in one sample (Quanterra lab #A5E030038-001) was slightly above control criteria. Similarly, the relative percent difference (RPD) between the duplicate recoveries was slightly above control criteria. Normally, no action is taken based solely on MS/MSD data, in terms of qualification, as these data alone do not give a complete indication of overall accuracy and precision. However, in conjunction with other QC data, the need for qualifications can be assessed.

In the case of the sample where the MSD and RPD criteria were exceeded, the associated check sample data indicated acceptable accuracy and field duplicate results indicated acceptable precision. Therefore, data qualifications were not deemed necessary in this case.

2.4 LABORATORY CHECK SAMPLES (LCS)

Laboratory check sample results are reviewed in order to further monitor laboratory accuracy. One LCS sample was analyzed in conjunction with the water samples.

LCS sample recoveries fell within laboratory-established limits, without exception. Therefore, data qualifications were not required on this basis.

2.5 FIELD DUPLICATE RESULTS

Field duplicate results are reviewed in order to assess combined field sampling and laboratory precision. The duplicate results for detected analytes were reviewed and a relative percent difference (RPD) between duplicate results calculated. One field duplicate was collected from monitoring well location OW-6B.

The RPD value indicated acceptable combined field sampling and laboratory precision. Qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

Quanterra Environmental Services

Quanterra incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

August 9, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for four water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received July 21 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to JoAnne Staubitz on August 3, 1995. A summary of QC data for these analyses is included at the end of the report.

Quanterra
Environmental
Services

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Total recoverable metals	SW846 6010A
ICP Trace (Inductively Coupled Plasma)	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-071995-01

WO #: COCE2
LAB #: A5G240121-001
MATRIX: WATER

DATE SAMPLED: 7/19/95
DATE RECEIVED: 7/21/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT ug/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Manganese	232	10.0	1.00	SW846 6010A	7/25- 8/01/95	520600

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-071995-02

#: C0CE6
3 #: A5G240121-002
:RIX: WATER

DATE SAMPLED: 7/19/95
DATE RECEIVED: 7/21/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

RAMETER	RESULT ug/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ad	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	520600
ryllium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	520600
dmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	520600
romium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	520600
nganese	220	10.0	1.00	SW846 6010A	7/25- 8/01/95	520600

TE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-071995-03

..J #: C0CE8	DATE SAMPLED: 7/19/95
LAB #: A5G240121-003	DATE RECEIVED: 7/21/95
: .TRIX: WATER	

\- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

..RAMETER	RESULT ug/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
:ad	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	520600
:ryilium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	520600
ıromium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	520600
ınganese	72.6	10.0	1.00	SW846 6010A	7/25- 8/01/95	520600

)TE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental
Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental Services

METHOD BLANK REPORT

F W. A5G240121

METALS

RAMETER	RESULT ug/L	REPORTING LIMIT	DIL FACTOR	METHOD	PREPARATION ANALYSIS DAT
		BATCH:5206005			
: yllium	ND	5.0	1.00	SW846 6010A	7/25- 7/27/9
admium	ND	5.0	1.00	SW846 6010A	7/25- 7/27/9
romium	ND	10.0	1.00	SW846 6010A	7/25- 7/27/9
anganese	ND	10.0	1.00	SW846 6010A	7/25- 7/27/9
: d	ND	3.0	1.00	SW846 6010A	7/25- 8/01/9

OTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CHECK SAMPLE REPORT

LAB #: A5G240121

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE	DILUTIC FACTOI
	BATCH:5206005			
Beryllium	108	(80-120)	7/25- 7/27/95	1.(
Cadmium	108	(80-120)	7/25- 7/27/95	1.(
Chromium	100	(80-120)	7/25- 7/27/95	1.(
Manganese	103	(80-120)	7/25- 7/27/95	1.(
Lead	100	(80-120)	7/25- 8/01/95	1.

Quanterra
Environmental
Services

METALS SPIKE REPORT

WATER - ICP

- - - - - - - - - - - - - - - - - -METALS- - - - - - - - - - - - - - - - -

POUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
..er	101	96	(61-126)	5	(0-20)	6/02-6/07/95	A4P8'
uminum	84	86	(56-147)	2	(0-20)	5/22-5/24/95	A4L9'
s-nic	95	94	(51-146)	1	(0-20)	5/26-6/01/95	A4LM
ron	90	90	(73-110)	0	(0-20)	3/20-3/24/95	A3EM
rium	100	95	(79-116)	5	(0-20)	6/02-6/07/95	A4P8'
: llium	105	100	(76-117)	5	(0-20)	6/02-6/07/95	A4P8'
lcium	99	87	(40-146)	13	(0-20)	6/02-6/07/95	A4P8
dmium	106	101	(70-109)	5	(0-20)	6/02-6/07/95	A4P8'
: lt	103	98	(75-110)	5	(0-20)	6/02-6/07/95	A498'
romium	105	101	(74-117)	4	(0-20)	6/02-6/07/95	A4P8'
-- -	101	97	(77-112)	4	(0-20)	6/02-6/07/95	A4P8'
:	98	86	(45-146)	13	(0-20)	6/02-6/07/95	A4P8'
tassium	91	85	(67-123)	7	(0-20)	6/02-6/07/95	A4P8'
: esium	99	93	(71-112)	6	(0-20)	6/02-6/07/95	A4P8'
: anese	104	97	(57-131)	7	(0-20)	6/02-6/07/95	A4P8'
lybdenum	96	96	(90-114)	0	(0-20)	3/20-3/21/95	A3E8
: um	93	95	(40-144)	2	(0-20)	6/02-6/07/95	A4P8
: el	104	99	(73-109)	5	(0-20)	6/02-6/07/95	A4P8
ad	103	96	(72-114)	7	(0-20)	6/02-6/07/95	A4P8'
: mony	105	100	(73-112)	5	(0-20)	6/02-6/07/95	A4P8
lenium	97	97	(30-175)	0	(0-20)	5/26-6/01/95	A4LM
r	113	104	(73-123)	8	(0-20)	5/22-5/25/95	A4M6'
: ontium	95	90	(83-112)	5	(0-20)	6/05-6/08/95	A4Q7
tanium	93	94	(80-111)	1	(0-20)	3/20-3/24/95	A3E8
: llium	95	90	(57-121)	5	(0-20)	6/02-6/07/95	A4P8
t sten	90	97	(72-112)	7	(0-20)	3/03-3/06/95	A31J
nadium	104	98	(79-112)	6	(0-20)	6/02-6/07/95	A4P8
t :	100	109	(67-118)	9	(0-20)	6/02-6/07/95	A4P8
: um	92	98	(80-120)	6	(0-20)	3/16-3/29/95	A399
thium	96	96	(80-120)	0	(0-20)	3/22-3/29/95	A3DE

Norcro·· GA 30093 404-441-0027

CHA... OF CUSTODY RECORD

3482

CLOREETOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	Lead				REMARKS
	7/19/95	1230	GW-3482-JSS-071995-01	G.W.	1	X	X	X	X	X				PRES. w/ HNO_3
	↓	1400	G.W.3482.JSS-071995-02	↓	1	↓	↓	↓	↓	↓				
		1630	G.W. 3482.JSS-071995 03		1									
		1600	GW-3482-JSS-071995-04		1									

TOTAL NUMBER OF CONTAINERS: 4

RELINQUISHED BY: ① [signature]	DATE: 7/20/95 TIME: 1630	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 5202185041

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER

RECEIVED FOR LABORATORY BY: Stacey Bickler

DATE: 7-21-95 TIME: 9:20 AM.

00661

Quanterra

Environmental Services

Quanterra incorporated
'101 Shuffel Drive, NW
th Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

Rec'd. CRA
AUG 23 1995

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright

Daniel J. Wright
Project Manager

August 21, 1995

Quanterra Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for two water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received July 25, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to Joanne Staubitz on August 16, 1995. A summary of QC data for these analyses is included at the end of the report.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

Parameters	Methods
Total recoverable metals	SW846 6010A
ICP Trace (Inductively Coupled Plasma)	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
COCDE	A5G240120-001	GW-3482-JOS-072095-05 (MS/MSD)
COCDH	A5G240120-002	GW-3482-JOS-072095-06
COCDJ	A5G240120-003	GW-3482-JOS-072095-07
COCDM	A5G240120-004	GW-3482-JOS-072195-08
COCDP	A5G240120-005	RB-1
COCDQ	A5G240120-006	GW-3482-JOS-072195-09
COCDR	A5G240120-007	SW-3482-JOS-072195-01

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-072095-05 (MS/MSD)

WO #: COCDE
LAB #: A5G240120-001
MATRIX: WATER

DATE SAMPLED: 7/20/95
DATE RECEIVED: 7/22/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Manganese	3,050	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JNP-102595-06

WO #: C1ML3
LAB #: A5J280118-006
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 11:00
DATE RECEIVED: 10/28/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Manganese	5,610	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072095-07

WO #: COCDJ
LAB #: A5G240120-003
MATRIX: WATER

DATE SAMPLED: 7/20/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Manganese	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-072195-08

WO #: COCDM
LAB #: A5G240120-004
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	3.0	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Manganese	1,910	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072195-09

) #: COCDQ
LAB #: ASG240120-006
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
eryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
admium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
hromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
langanese	15.0	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

RB-1

WO #: COCDP
LAB #: ASG240120-005
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Manganese	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-072195-01

WO #: COCDR
LAB #: A5G240120-007
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	22.2	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Aluminum	1,870	200	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Copper	18.0	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Nickel	ND	40.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Zinc	85.0	20.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

OTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

QUALITY CONTROL SECTION

Quanterra
Environmental
Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

"DIL" in the quality control section means that due to high analyte concentration in the sample, the spiking analytes addded to the sample are diluted out and cannot be quantitated.

Quanterra Environmental Services

CHECK SAMPLE REPORT

LAB #: A5G240120

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5206005		
Aluminum	100	(80-120)	7/25- 7/27/95
Beryllium	108	(80-120)	7/25- 7/27/95
Cadmium	108	(80-120)	7/25- 7/27/95
Chromium	100	(80-120)	7/25- 7/27/95
Copper	106	(80-120)	7/25- 7/27/95
Manganese	103	(80-120)	7/25- 7/27/95
Nickel	104	(80-120)	7/25- 7/27/95
Lead	100	(80-120)	7/25- 8/01/95
Zinc	105	(80-120)	7/25- 7/27/95

Quanterra
Environmental Services

MATRIX SPIKE REPORT

AB #: A5G240120-001

- METALS -

OMPOUND		SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
			BATCH:5206005 MATRIX:		WATER		
eryllium		100	100	(80-120)	0	(0-20)	7/25- 8/11/95
admium		106	106	(80-120)	0	(0-20)	7/25- 8/11/95
omium		104	106	(80-120)	0.95	(0-20)	7/25- 8/11/95
ganese	DIL						7/25- 8/11/95
ead		108	110	(80-120)	1.1	(0-20)	7/25- 8/09/95

TE:
Diluted out

re performed before rounding to avoid round-off errors in calculated results

Quanterra Environmental Services

METHOD BLANK REPORT

LAB #: A5G240120

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5206005			
Aluminum	ND	200	ug/L	SW846 6010A	7/25- 8/11/95
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 7/27/95
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 7/27/95
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 7/27/95
Copper	ND	5.0	ug/L	SW846 6010A	7/25- 7/27/95
Manganese	ND	10.0	ug/L	SW846 6010A	7/25- 7/27/95
Nickel	ND	40.0	ug/L	SW846 6010A	7/25- 7/27/95
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/01/95
Zinc	ND	20.0	ug/L	SW846 6010A	7/25- 8/01/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

METALS SPIKE REPORT

WATER - ICP

\- -METALS- -

OMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
Silver	101	96	(61-126)	5	(0-20)	6/02-6/07/95	A4P8
Aluminum	84	86	(56-147)	2	(0-20)	5/22-5/24/95	A4L9
rsenic	95	94	(51-146)	1	(0-20)	5/26-6/01/95	A4LM
Boron	90	90	(73-110)	0	(0-20)	3/20-3/24/95	A3EM
Barium	100	95	(79-116)	5	(0-20)	6/02-6/07/95	A4P8
eryllium	105	100	(76-117)	5	(0-20)	6/02-6/07/95	A4P8
Calcium	99	87	(40-146)	13	(0-20)	6/02-6/07/95	A4P8
admium	106	101	(70-109)	5	(0-20)	6/02-6/07/95	A4P8
obalt	103	98	(75-110)	5	(0-20)	6/02-6/07/95	A498
Chromium	105	101	(74-117)	4	(0-20)	6/02-6/07/95	A4P8
opper	101	97	(77-112)	4	(0-20)	6/02-6/07/95	A4P8
ron	98	86	(45-146)	13	(0-20)	6/02-6/07/95	A4P8
Potassium	91	85	(67-123)	7	(0-20)	6/02-6/07/95	A4P8
agnesium	99	93	(71-112)	6	(0-20)	6/02-6/07/95	A4P8
anganese	104	97	(57-131)	7	(0-20)	6/02-6/07/95	A4P8
ybdenum	96	96	(90-114)	0	(0-20)	3/20-3/21/95	A3E8
odium	93	95	(40-144)	2	(0-20)	6/02-6/07/95	A4P8
ickel	104	99	(73-109)	5	(0-20)	6/02-6/07/95	A4P8
ead	103	96	(72-114)	7	(0-20)	6/02-6/07/95	A4P8
ntimony	105	100	(73-112)	5	(0-20)	6/02-6/07/95	A4P8
elenium	97	97	(30-175)	0	(0-20)	5/26-6/01/95	A4LM
in	113	104	(73-123)	8	(0-20)	5/22-5/25/95	A4M6
trontium	95	90	(83-112)	5	(0-20)	6/05-6/08/95	A4Q7
itanium	93	94	(80-111)	1	(0-20)	3/20-3/24/95	A3E8
hallium	95	90	(57-121)	5	(0-20)	6/02-6/07/95	A4P8
ungsten	90	97	(72-112)	7	(0-20)	3/03-3/06/95	A31J
Vanadium	104	98	(79-112)	6	(0-20)	6/02-6/07/95	A4P8
inc	100	109	(67-118)	9	(0-20)	6/02-6/07/95	A4P8
smium	92	98	(80-120)	6	(0-20)	3/16-3/29/95	A399
Lithium	96	96	(80-120)	0	(0-20)	3/22-3/29/95	A3DE

CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 ( )rook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: J L Schh

PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	Lead	Aluminum	Copper	Nickel	Zinc	REMARKS
	7/20/95	1030	GW-3482-JJS-072095-05 MS/MSD	GW	2	↓	↓	↓	↓	↓					ALL PRES. W/ HNO_3 - (*05 MS/MSD)
	↓	1330	GW-3482-JJS-072095-06	↓	1										
		1730	GW-3482-JJS-072095-07		1										
	7/21/95	1115	GW-3482-JJS-072195-08		1										
	↓	0830	RB-1	D.I.	1										
		1500	GW-3482-JJS-072195-09	GW	1										
		1600	SW-3482-JJS-072195-01	SW	1			X		X	X	X	X	X	

TOTAL NUMBER OF CONTAINERS: 8

RELINQUISHED BY: ① J L Schh	DATE: 7/21/95 TIME: 1730	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④ Jessica M. Hudson	DATE: 7/22/95 TIME: 2:00pm

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 5202135293

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER

RECEIVED FOR LABORATORY BY:

DATE: TIME:

00662

Quanterra incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

Quanterra
Environmental
Services

Rec'd. CRA
AUG 23 1995

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

August 21, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for seven water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received July 22, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on August 15, 1995. A summary of QC data for these analyses is included at the end of the report.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

A5J280118

Parameters	Methods
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

SAMPLE SUMMARY

Quanterra Environmental Services

The analytical results of the samples listed below are presented on the following pages.

LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	
A5G250102-001	GW-3482-JOS-072295-010	7/22/95	20:00
A5G250102-002	GW-3482-JOS-072395-011	7/23/95	14:00

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102695-10

WO #: C1ML8
LAB #: A5J280118-011
MATRIX: WATER

DATE SAMPLED: 10/26/95
TIME SAMPLED: 10:30
DATE RECEIVED: 10/28/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Berylilium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Manganese	1,430	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072395-011

WO #: COCH4
LAB #: A5G250102-002
MATRIX: WATER

DATE SAMPLED: 7/23/95
TIME SAMPLED: 14:00
DATE RECEIVED: 7/25/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Beryllium	ND	5.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Cadmium	ND	5.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Chromium	ND	10.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Manganese	91.0	10.0	ug/L	SW846 6010A	8/02- 8/14/95	5213105

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental
Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental
Services

CHECK SAMPLE REPORT

LAB #: A5G250102

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5213105		
Beryllium	100	(80-120)	8/02- 8/09/95
Cadmium	98	(80-120)	8/02- 8/09/95
Chromium	102	(80-120)	8/02- 8/09/95
Manganese	102	(80-120)	8/02- 8/09/95
Lead	101	(80-120)	8/02- 8/09/95

Quanterra Environmental Services

METHOD BLANK REPORT

L... #: A5G250102

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5213105			
Beryllium	ND	5.0	ug/L	SW846 6010A	8/02- 8/09/95
Cadmium	ND	5.0	ug/L	SW846 6010A	8/02- 8/09/95
Chromium	ND	10.0	ug/L	SW846 6010A	8/02- 8/09/95
Manganese	ND	10.0	ug/L	SW846 6010A	8/02- 8/09/95
Lead	ND	3.0	ug/L	SW846 6010A	8/02- 8/11/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

METALS SPIKE REPORT

WATER - ICP

- -METALS- -

MPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
ilver	101	96	(61-126)	5	(0-20)	6/02-6/07/95	A4P8T
luminum	84	86	(56-147)	2	(0-20)	5/22-5/24/95	A4L9P
senic	95	94	(51-146)	1	(0-20)	5/26-6/01/95	A4LM1
oron	90	90	(73-110)	0	(0-20)	3/20-3/24/95	A3EM4
rium	100	95	(79-116)	5	(0-20)	6/02-6/07/95	A4P8T
ryllium	105	100	(76-117)	5	(0-20)	6/02-6/07/95	A4P8T
alcium	99	87	(40-146)	13	(0-20)	6/02-6/07/95	A4P8T
dmium	106	101	(70-109)	5	(0-20)	6/02-6/07/95	A4P8T
balt	103	98	(75-110)	5	(0-20)	6/02-6/07/95	A498T
mium	105	101	(74-117)	4	(0-20)	6/02-6/07/95	A4P8T
er	101	97	(77-112)	4	(0-20)	6/02-6/07/95	A4P8T
on	98	86	(45-146)	13	(0-20)	6/02-6/07/95	A4P8T
otassium	91	85	(67-123)	7	(0-20)	6/02-6/07/95	A4P8T
gnesium	99	93	(71-112)	6	(0-20)	6/02-6/07/95	A4P8T
nganese	104	97	(57-131)	7	(0-20)	6/02-6/07/95	A4P8T
lybdenum	96	96	(90-114)	0	(0-20)	3/20-3/21/95	A3E8H
dium	93	95	(40-144)	2	(0-20)	6/02-6/07/95	A4P8T
ickel	104	99	(73-109)	5	(0-20)	6/02-6/07/95	A4P8T
ad	103	96	(72-114)	7	(0-20)	6/02-6/07/95	A4P8T
timony	105	100	(73-112)	5	(0-20)	6/02-6/07/95	A4P8T
Selenium	97	97	(30-175)	0	(0-20)	5/26-6/01/95	A4LM1
n	113	104	(73-123)	8	(0-20)	5/22-5/25/95	A4M6D
rontium	95	90	(83-112)	5	(0-20)	6/05-6/08/95	A4Q72
Titanium	93	94	(80-111)	1	(0-20)	3/20-3/24/95	A3E8H
allium	95	90	(57-121)	5	(0-20)	6/02-6/07/95	A4P8T
ungsten	90	97	(72-112)	7	(0-20)	3/03-3/06/95	A31JQ
Vanadium	104	98	(79-112)	6	(0-20)	6/02-6/07/95	A4P8T
inc	100	109	(67-118)	9	(0-20)	6/02-6/07/95	A4P8T
Osmium	92	98	(80-120)	6	(0-20)	3/16-3/29/95	A399A
Lithium	96	96	(80-120)	0	(0-20)	3/22-3/29/95	A3DEK

CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 C rook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	LEAD					REMARKS
															ALL PRES. W/ HNO3
	7/22/95	2000	GW-3482-JDS-072295-010	GW	1	X	X	X	X	X					
	7/23/95	1400	GW-3482-JDS-072395-011	GW	1	X	X	X	X	X					

TOTAL NUMBER OF CONTAINERS: 2

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	DATE / TIME
① [signature]	DATE: 7/24/95 TIME: 1200	②	DATE: TIME:
②	DATE: TIME:	③	DATE: TIME:
③	DATE: TIME:	④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: ~~5202145052~~

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER

RECEIVED FOR LABORATORY BY: [signature]

DATE: 7/25/95 TIME: 9:40 am

00663

MEMO

TO: Joanne Staubitz REFERENCE NO: 3482

FROM: Lou Almeida/ev/13 DATE: August 28, 1995

C.C.: John Schwaller

RE: Data Quality Assurance Evaluation
Groundwater Sample
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Eleven groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia between July 19 and July 23, 1995. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of chromium, lead, aluminum, copper, nickel and zinc.

This memo presents an analytical assessment and validation of results obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were received in three reports provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, field duplicate data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection date noted in the chain-of-custody document and the sample preparation/analysis date reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis was analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSES

Method blank samples were used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in any of the blanks analyzed in conjunction with the analyzed samples. Data qualifications were not required on the basis of blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples were analyzed in order to monitor laboratory performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

2.4 MATRIX SPIKE (MS) ANALYSES

Matrix spike (MS) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS recoveries fell within control limits of 75 to 125 percent, indicating acceptable method accuracy. Data qualifications were not required on this basis.

2.5 RINSATE BLANK ANALYSES

One rinsate blank sample was collected in order to assess the efficiency of field decontamination procedures conducted at the site.

The rinsate blank was free of all target parameters indicating that effective field decontamination procedures had been conducted at the site. Data qualifications were not required on this basis.

2.6 FIELD DUPLICATE ANALYSES

In order to assess combined field sampling and laboratory precision, a field duplicate sample was collected and submitted for analysis. The field duplicate results were reviewed and a relative percent difference (RPD) was calculated between detected results. Upon review, the RPD data obtained indicated acceptable combined field sampling and laboratory precision. Data qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

Quanterra
Environmental
Services

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL SITE

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

November 15, 1995

Quanterra
Environmental
Services

PROJECT NARRATIVE

The following report contains the analytical results for fourteen water samples submitted to Quanterra-North Canton by Conestoga-Rovers and Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received October 28, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on November 3, 1995. A summary of QC data for these analyses is included at the end of the report.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

Parameters	Methods
Inductively Coupled Plasma (ICP)	SW846 6010A
Trace Inductively Coupled Plasma (Trace ICP)	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

SAMPLE SUMMARY

Quanterra
Environmental
Services

The analytical results of the samples listed below are presented on the following pages.

O #	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPL	
1MKV	A5J280118-001	GW-3482-JOS-102395-01	10/23/95	16:00
1MKW	A5J280118-002	GW-3482-JOS-102395-02	10/23/95	17:45
1MKX	A5J280118-003	GW-3482-JOS-102495-03 (MS/MSD)	10/24/95	13:00
1ML0	A5J280118-004	GW-3482-JOS-102495-04	10/24/95	16:40
1ML2	A5J280118-005	GW-3482-JNP-102595-05	10/25/95	10:37
1ML3	A5J280118-006	GW-3482-JNP-102595-06	10/25/95	11:00
1ML4	A5J280118-007	GW-3482-JNP-102595-07	10/25/95	13:45
1ML5	A5J280118-008	GW-3482-JOS-102595-08	10/25/95	14:30
1ML6	A5J280118-009	GW-3482-JOS-102595-09	10/25/95	16:00
1ML7	A5J280118-010	SW-3482-JOS-102595-01	10/25/95	17:00
ML8	A5J280118-011	GW-3482-JOS-102695-10	10/26/95	10:30
L9	A5J280118-012	GW-3482-JOS-102695-11	10/26/95	11:30
MLA	A5J280118-013	GW-3482-JOS-102695-12	10/26/95	12:00
1MLC	A5J280118-014	GW-3482-JOS-102695-13	10/26/95	17:00

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-102395-01

WO #: C1MKV	DATE SAMPLED: 10/23/95
LAB #: A5J280118-001	TIME SAMPLED: 16:00
MATRIX: WATER	DATE RECEIVED: 10/28/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Manganese	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102395-02

WO #:	C1MKW	DATE SAMPLED:	10/23/95
LAB #:	ASJ280118-002	TIME SAMPLED:	17:45
MATRIX:	WATER	DATE RECEIVED:	10/28/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Manganese	285	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-102495-03 (MS/MSD)

WO #: C1MKX
LAB #: A5J280118-003
MATRIX: WATER

DATE SAMPLED: 10/24/95
TIME SAMPLED: 13:00
DATE RECEIVED: 10/28/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Manganese	227	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102495-04

WO #: C1ML0	DATE SAMPLED: 10/24/95
LAB #: A5J280118-004	TIME SAMPLED: 16:40
MATRIX: WATER	DATE RECEIVED: 10/28/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Manganese	3,260	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JNP-102595-05

WO #: C1ML2
LAB #: A5J280118-005
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 10:37
DATE RECEIVED: 10/28/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Manganese	5,740	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JNP-102595-06

WO #: C1ML3	DATE SAMPLED: 10/25/95
LAB #: A5J280118-006	TIME SAMPLED: 11:00
MATRIX: WATER	DATE RECEIVED: 10/28/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Manganese	5,610	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JNP-102595-07

WO #: C1ML4
LAB #: A5J280118-007
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 13:45
DATE RECEIVED: 10/28/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Manganese	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102595-08

WO #: C1ML5
LAB #: A5J280118-008
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 14:30
DATE RECEIVED: 10/28/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Chromium	17.5	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Manganese	13.9	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-102595-09

WO #: C1ML6
LAB #: A5J280118-009
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 16:00
DATE RECEIVED: 10/28/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Manganese	30.6	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-102595-01

WO #: C1ML7
LAB #: A5J280118-010
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 17:00
DATE RECEIVED: 10/28/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Aluminum	ND	200	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Copper	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Nickel	ND	40.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Zinc	ND	20.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102695-10

WO #: C1ML8
LAB #: A5J280118-011
MATRIX: WATER

DATE SAMPLED: 10/26/95
TIME SAMPLED: 10:30
DATE RECEIVED: 10/28/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Manganese	1,430	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-102695-11

WO #: C1ML9
LAB #: A5J280118-012
MATRIX: WATER

DATE SAMPLED: 10/26/95
TIME SAMPLED: 11:30
DATE RECEIVED: 10/28/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Manganese	16.7	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102695-12

WO #: C1MLA
LAB #: A5J280118-013
MATRIX: WATER

DATE SAMPLED: 10/26/95
TIME SAMPLED: 12:00
DATE RECEIVED: 10/28/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Manganese	4,990	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102695-13

WO #: C1MLC
LAB #: A5J280118-014
MATRIX: WATER

DATE SAMPLED: 10/26/95
TIME SAMPLED: 17:00
DATE RECEIVED: 10/28/95

- - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Manganese	96.7	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

The AD/RPD for the manganese MS/MSD performed on sample A5J280118-003 was outside laboratory acceptance criteria. Remaining elements spiked from the same spiking solution and from the same prep were within laboratory acceptance criteria. Matrix effect was demonstrated and associated results were accepted.

Quanterra
Environmental
Services

CHECK SAMPLE REPORT

LAB #: A5J280118

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5304117		
Aluminum	107	(80-120)	10/31-11/01/95
Beryllium	99	(80-120)	10/31-11/01/95
Cadmium	104	(80-120)	10/31-11/01/95
Chromium	100	(80-120)	10/31-11/01/95
Copper	102	(80-120)	10/31-11/01/95
Manganese	101	(80-120)	10/31-11/01/95
Nickel	102	(80-120)	10/31-11/01/95
Lead	104	(80-120)	10/31-11/01/95
Zinc	116	(80-120)	10/31-11/01/95

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: A5J280118

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION ANALYSIS DATE
		BATCH:5304117			
Aluminum	ND	200	ug/L	SW846 6010A	10/31-11/01/9
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/9
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/9
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/9
Copper	ND	5.0	ug/L	SW846 6010A	10/31-11/01/9
Manganese	ND	10.0	ug/L	SW846 6010A	10/31-11/01/9
Nickel	ND	40.0	ug/L	SW846 6010A	10/31-11/01/9
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/9
Zinc	ND	20.0	ug/L	SW846 6010A	10/31-11/01/9

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

MATRIX SPIKE REPORT

LAB #: A5J280118-003

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:5304117 MATRIX:		WATER		
Beryllium	86	100	(80-120)	15	(0-20)	10/31-11/01/95
Cadmium	92	106	(80-120)	15	(0-20)	10/31-11/01/95
Chromium	87	102	(80-120)	16	(0-20)	10/31-11/01/95
Manganese	86	109	(80-120)	23	(0-20)	10/31-11/01/95
Lead	85	99	(80-120)	16	(0-20)	10/31-11/01/95

NOTE:

Calculations are performed before rounding to avoid round-off errors in calculated results

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL SITE

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese	Aluminum	Copper	Nickel	Zinc	REMARKS
	10/23/95	1600	GW-3482-JOS-102395-01	GW	1	X	X	X	X	X					All pres. w/ HNO_3
	10/23/95	1745	GW-3482-JOS-102395-02	GW	1	↓	↓	↓	↓	↓					
	10/24/95	1300	GW-3482-JOS-102495-03MS/MSD	GW	2	↓	↓	↓	↓	↓					
	10/24/95	1640	GW-3482-JOS-102495-04	GW	1	↓	↓	↓	↓	↓					
	10/25/95	1037	GW-3482-JNP-102595-05	GW	1	↓	↓	↓	↓	↓					
	10/25/95	1100	GW-3482-JNP-102595-06	GW	1	↓	↓	↓	↓	↓					
	10/25/95	1345	GW-3482-JNP-102595-07	GW	1	↓	↓	↓	↓	↓					
	10/25/95	1430	GW-3482-JOS-102595-08	GW	1	↓	↓	↓	↓	↓					
	10/25/95	1600	GW-3482-JOS-102595-09	GW	1	↓	↓	↓	↓	↓					
	10/25/95	1700	SW-3482-JOS-102595-01	SW	1			X	X		X	X	X	X	
	10/26/95	1030	GW-3482-JOS-102695-10	GW	1	X	X	X	X	X					
	10/26/95	1130	GW-3482-JOS-102695-11	GW	1	X	X	X	X	X					
	10/26/95	1200	GW-3482-JOS-102695-12	GW	1	X	X	X	X	X					
	10/26/95	1700	GW-3482-JOS-102695-13	GW	1	X	X	X	X	X					

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: ① [signature]	DATE: 10/27/95 TIME: 1200	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 316 8906 106

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER, NEIL PICKARD

RECEIVED FOR LABORATORY BY: [signature]

DATE: 951028 TIME: 1000A

№ 00400

MEMO

TO: Joanne Staubitz | REFERENCE NO: 3482

FROM: Lou Almeida/ev/15 | DATE: November 29, 1995

RE: Data Quality Assurance Evaluation
Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Thirteen groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia between October 23 and October 26, 1995. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results received in a report (No. ASJ280118) obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were received in a report provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection date noted in the chain-of-custody document and the sample preparation/analysis date reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSES

Method blank samples were used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in any of the blanks analyzed in conjunction with the analyzed samples. Data qualifications were not required on the basis of blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples were analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries fell within laboratory established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20 indicating acceptable method precision. Data qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

Quanterra
Environmental
Services

Quanterra incorporated
4101 Shuffel Drive, NW
Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

Received
JAN 2 1996

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

January 24, 1996

Quanterra
Environmental
Services

CASE NARRATIVE

The following report contains the analytical results for fourteen water samples submitted to Quanterra-North Canton by Conestoga-Rovers and Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received January 6, 1996, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in the metals section of the quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

A6A060116

Parameters	Methods
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

Quanterra
Environmental
Services

The analytical results of the samples listed below are presented on the following pages.

:	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	
:L	A6A060116-001	GW-3482-JOS-010296-01	1/02/96	15:45
:--	A6A060116-002	GW-3482-JOS-010296-02	1/02/96	17:30
:	A6A060116-003	GW-3482-JOS-010296-03	1/02/96	18:00
:P	A6A060116-004	GW-3482-JOS-010296-04 (MS/MSD)	1/02/96	17:20
:Q	A6A060116-005	GW-3482-JOS-010396-05	1/03/96	10:30
:	A6A060116-006	GW-3482-JOS-010396-06	1/03/96	11:30
:	A6A060116-007	GW-3482-JOS-010396-07	1/03/96	14:00
:V	A6A060116-008	GW-3482-JOS-010396-08	1/03/96	13:00
:W	A6A060116-009	GW-3482-JOS-010396-09	1/03/96	15:00
1	A6A060116-010	GW-3482-JOS-010396-10	1/03/96	16:00
1L	A6A060116-011	GW-3482-JOS-010496-11	1/04/96	11:00
12	A6A060116-012	GW-3482-JOS-010496-12	1/04/96	11:45
1	A6A060116-013	GW-3482-JOS-010496-13	1/04/96	15:00
1	A6A060116-014	SW-3482-JOS-010396-01	1/03/96	17:00

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC..LTD.

GW-3482-JOS-010296-01

#: C2K2L
#: A6A060116-001
TRIX: WATER

DATE SAMPLED: 1/02/96
TIME SAMPLED: 15:45
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ad	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
ryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
dmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
romium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
nganese	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-010296-02

WO #: C2K2M
LAB #: A6A060116-002
MATRIX: WATER

DATE SAMPLED: 1/02/96
TIME SAMPLED: 17:30
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Manganese	3,700	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010296-03

IO #: C2K2N
LAB #: A6A060116-003
MATRIX: WATER

DATE SAMPLED: 1/02/96
TIME SAMPLED: 18:00
DATE RECEIVED: 1/06/96

REQUESTED METALS

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
eryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
admium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
hromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
anganese	3,840	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010296-04 (MS/MSD)

WO #: C2K2P
LAB #: A6A060116-004
ATRIX: WATER

DATE SAMPLED: 1/02/96
TIME SAMPLED: 17:20
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
:ad	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
:ryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
.romium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
langanese	10.1	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

* AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-05

O #: C2K2Q
AB #: A6A060116-005
ATRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 10:30
DATE RECEIVED: 1/06/96

- REQUESTED METALS -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
eryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
admium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
hromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
anganese	252	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-06

O #: C2K2R
?ᵖ #: A6A060116-006
) RIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 11:30
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
e d	4.2	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
e.yllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
admium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
: omium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
anganese	152	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-07

O #: C2K2T
AB #: A6A060116-007
ATRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 14:00
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
eryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
admium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
hromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
anganese	15.4	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-08

#: C2K2V
? #: A6A060116-008
I IX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 13:00
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
:	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
:yllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
dmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
: mium	10.7	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
nganese	23.9	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

S RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-010396-09

#: C2K2W
B #: A6A060116-009
TRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 15:00
DATE RECEIVED: 1/06/96

- REQUESTED METALS -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ad	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
ryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
dmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
romium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
nganese	468	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-10

WO #: C2K30
LAB #: A6A060116-010
ATRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 16:00
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC
ad	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
ryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
iromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
nganese	3,490	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010496-11

O #: C2K31
AB #: A6A060116-011
ATRIX: WATER

DATE SAMPLED: 1/04/96
TIME SAMPLED: 11:00
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
eryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
admium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
hromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
anganese	4,480	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010496-12

O #: C2K32
AB #: A6A060116-012
; RIX: WATER

DATE SAMPLED: 1/04/96
TIME SAMPLED: 11:45
DATE RECEIVED: 1/06/96

- REQUESTED METALS -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
d	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
yllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
admium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
omium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
ganese	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

S RECEIVED
D NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010496-13

) #: C2K33
.B #: A6A060116-013
.TRIX: WATER

DATE SAMPLED: 1/04/96
TIME SAMPLED: 15:00
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ad	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
ryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
dmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
romium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
nganese	1,660	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-010396-01

) #: C2K34
:ᵐ #: A6A060116-014
RIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 17:00
DATE RECEIVED: 1/06/96

- REQUESTED METALS -

RAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
: i	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
..minum	ND	200	ug/L	SW846 6010A	1/08- 1/09/96	6008128
.romium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
· per	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
ckel	ND	40.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
nc	ND	20.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

S RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY ASSURANCE/QUALITY CONTROL PROGRAM ELEMENTS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. QC samples provide a mechanism for assessing the overall quality of the analytical batch and can be used to indicate the usability of the analytical data. These QC samples include but are not limited to check samples, method blanks, matrix spikes and surrogate spikes.

The QUALITY CONTROL BATCH (QC Batch) is a set of up to 20 field samples of similar matrix that behave similarly and are processed using the same procedures, reagents, and standards within the same time period. All samples must be associated with a QC batch. Laboratory-generated QC samples that are used to generated QC data are not included in the count of 20 field samples. Additional QC that are requested must be included in the count as field samples. Included in each QC Batch is a Method Blank (MB), Laboratory Control Sample (LCS), and Matrix Spike/Matrix Spike Duplicate (MS/MSD). Alternatively, a matrix spike and sample duplicate (MS/DU) may be used in place of the MS/MSD when described by the method or requested by the client. Also, a LCS/LCSD is prepared if there is insufficient sample in a batch to perform a MS/MSD. For methods that require independent preparation prior to analysis, the QC Batch is defined at the preparation stage. For methods that do not require independent eparation, the QC Batch is defined at the instrument.

The LABORATORY CONTROL SAMPLE (LCS) is a laboratory generated sample beginning with a known and well-characterized matrix that is fortified with target analytes and used to monitor the laboratory's day to day as well as ongoing performance of the applicable analytical methods. The LCS, when spiked with the representative target analytes, is used to monitor the accuracy of the analytical process. Ongoing monitoring of the LCS results provides evidence that the laboratory is performing the method within acceptable accuracy and precision guidelines.

If any analyte is outside established control limits, the system is out of control and corrective action **must** occur. Corrective action may include reanalysis of the LCS extract or digestate, or repreparation or reanalysis of all samples associated with that QC batch. Repreparation and reanalysis of the LCS cannot be performed independently from the field samples in the associated QC batch.

The METHOD BLANK (MB) is a quality control sample that consists of all reagents specific to the method that is carried through every aspect of the procedure including preparation, cleanup and analysis. The method blank is used to identify any interferences or contamination of the analytical system that may lead to the reporting of elevated analyte concentrations or false positive data.

All analytes of interest in the method blank must be below the reporting limit (RL) except for the following common laboratory contaminants.

Volatiles (GC or GC/MS)	Semi-Volatiles (GC/MS)	Metals (ICP or GFAA)
Methylene Chloride	Phthalate Esters	Copper
Acetone		Zinc
2-Butanone (MEK)		Iron
		Lead*

**TJA Trace ICP or GFAA only*

These commonly detected laboratory contaminants may be present if the concentration of the analyte is less than five times the RL for organic methods and less than two times the RL for inorganic methods. If there is no target analyte greater than the RL in the samples associated with an unacceptable MB, the data may be reported.

MATRIX SPIKES (MSs) are environmental samples to which known concentrations of target analytes (the same analytes of interest used in the LCS and described in the method SOP) have been added. MATRIX SPIKE DUPLICATES (MSDs) are second aliquots of the same samples (spike identically as the MS) prepared and analyzed along with the sample and matrix spike. The MS/MSD results are used to determine the effect of a matrix on the precision and accuracy of the analytical process. Due to the potential variability of the matrix of each sample, the MS/MSD results have immediate bearing only on the specific sample spiked and not all samples in the QC Batch.

If an analyte is out of control in the MS/MSD it must be in control in the LCS for the QC batch to be accepted. In cases where it is not possible to calculate the MS/MSD recoveries due to dilutions or interferences, the data is reported as "NC" (i.e., not calculated).

SURROGATE SPIKES are used by the laboratory to indicate method bias introduced by the sample matrix during the preparation and analysis of a specific method. Surrogates are normally organic compounds similar to those being analyzed for the GC or GC/MS. If surrogate recoveries fail to meet laboratory acceptance criteria it does not necessarily indicate poor laboratory control but may in fact be attributed to a sample matrix effect. In the event that surrogates fail criteria, a repreparation and reanalysis is performed to determine the presence of a matrix effect.

All surrogate recoveries must be within established control limits, except for Pesticides/PCBs, PAHs, TPHs, and Herbicides which applies a tiered acceptance approach (one out of two surrogates must be in control). If the surrogate recoveries that are outside control limits cannot be attributed to laboratory error, the decision to reanalyze or flag the data should be made in consultation with the client. Provided all other QC acceptance criteria are met, it is only necessary to reprepare/reanalyze a sample one time to demonstrate that a poor surrogate recovery is due to matrix effect.

Quanterra
Environmental
Services

CHECK SAMPLE REPORT

LAB #: A6A060116

- METALS -

..POUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:6008128		
l ninum	101	(80-120)	1/08- 1/09/96
eryllium	110	(80-120)	1/08- 1/09/96
admium	104	(80-120)	1/08- 1/09/96
omium	106	(80-120)	1/08- 1/09/96
..per	103	(80-120)	1/08- 1/09/96
nganese	101	(80-120)	1/08- 1/09/96
.-kel	101	(80-120)	1/08- 1/09/96
d	101	(80-120)	1/08- 1/09/96
nc	106	(80-120)	1/08- 1/09/96

Quanterra Environmental Services

METHOD BLANK REPORT

LAB #: A6A060116

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:6008128			
Aluminum	ND	200	ug/L	SW846 6010A	1/08- 1/09/96
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96
Copper	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96
Manganese	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96
Nickel	ND	40.0	ug/L	SW846 6010A	1/08- 1/09/96
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96
[illegible]	ND	20.0	ug/L	SW846 6010A	1/08- 1/09/96

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

MATRIX SPIKE REPORT

AB #: A6A060116-004

- METALS -

I UND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:6008128 MATRIX:		WATER		
lium	94	94	(80-120)	0.36	(0-20)	1/08- 1/09/96
um	100	100	(80-120)	0.10	(0-20)	1/08- 1/09/96
omium	95	95	(80-120)	0.15	(0-20)	1/08- 1/09/96
ganese	98	97	(80-120)	0.51	(0-20)	1/08- 1/09/96
:	96	96	(80-120)	0.56	(0-20)	1/08- 1/09/96

are performed before rounding to avoid round-off errors in calculated results

CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oak[illegible]ok Drive Suite 150
Norcross, [illegible] 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SAM PARKA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese	Aluminum	Copper	Nickel	Zinc	REMARKS
	1/2/96	1545	GW-3482-JDS-010296-01	GW	1	X	X	X	X	X					
	↓	1730	GW-3482-JDS-010296-02	GW	1										
		1800	GW-3482-JDS-010296-03	GW	1										
		1720	GW-3482-JDS-010296-04MS/MSD	GW	2										
	1/3/96	1030	GW-3482-JDS-010396-05	GW	1										
	↓	1130	GW-3482-JDS-010396-06	GW	1										
		1400	GW-3482-JDS-010396-07	GW	1										
		1300	GW-3482-JDS-010396-08	GW	1										
		1500	GW-3482-JDS-010396-09	GW	1										
		1600	GW-3482-JDS-010396-10	GW	1										
	1/4/96	1100	GW-3482-JDS-010496-11	GW	1										
	↓	1145	GW-3482-JDS-010496-12	GW	1										
		1500	GW-3482-JDS-010496-13	GW	1										
		1700	SW-3482-JDS-010396-01	SW	1			X	X		X	X	X	X	

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: ① [signature]	DATE: 1/5/96 TIME: 0700	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 124 9058 115

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER
NEIL PICKARD

RECEIVED FOR LABORATORY BY: Kathy J. Graves

DATE: 1/6/96 TIME: 1010A

00488

1007(FORMS) — DEC 6, 93 — REV.D — (AF-01)

Joan Schwaller

MEMO

TO: Joanne Staubitz

REFERENCE NO: 3482

FROM: Lou Almeida/ev/17

DATE: February 1, 1996

RE: Data Quality Assurance Evaluation
Quarterly Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Thirteen groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia between January 2 and January 4, 1996. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results received in a report (No. A6A06116) obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were received in a report provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Final Update IIB, January 1995. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection dates noted in the chain-of-custody document and the sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSIS

A method blank sample was used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in the blank analyzed in conjunction with the analyzed samples. Data qualifications were not required on the basis of blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

A laboratory check sample was analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries fell within laboratory established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20 indicating acceptable method precision. Data qualifications were not required on this basis.

2.5 RINSE BLANK ANALYSES

Rinse blank analyses were used to determine the efficiency of field decontamination procedures conducted during this sampling event. One rinse blank sample (GW-3482-JOS-010396-08) was collected and submitted for analyses.

Chromium (10.7 µg/L) and manganese (23.9 µg/L) were detected in the rinse blank. Qualifications were not required as chromium was not detected in the associated sample (GW-3482-JOS-010396-10) and manganese was detected at a level which exceeded ten times the blank result.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

Quanterra
Environmental
Services

Quanterra Incorporated
4101 Shuffel Drive NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL
Lot#: A6D260120

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Michele M Waley/FCR
Brian M. Greenwell
Project Manager

May 10, 1996

Quanterra
Environmental Services

CASE NARRATIVE

The following report contains the analytical results for sixteen water samples submitted to Quanterra-North Canton by Conestoga-Rovers and Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received April 26, 1996, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on May 8, 1996.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in the metals section of the quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of an MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental
Services

ANALYTICAL METHODS SUMMARY
A6D260120

Parameters	Methods
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

Quanterra Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

_	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	
X	A6D260120-001	GW-3482-JOS-042296-01	4/22/96	16:00
0	A6D260120-002	GW-3482-JOS-042296-02	4/22/96	16:30
1	A6D260120-003	GW-3482-JOS-042296-03	4/22/96	17:15
2	A6D260120-004	GW-3482-JOS-042296-04	4/22/96	18:30
3	A6D260120-005	GW-3482-JOS-042396-05	4/23/96	9:30
5	A6D260120-006	GW-3482-JOS-042396-06 (MS/MSD)	4/23/96	9:30
7	A6D260120-007	GW-3482-JOS-042396-07	4/23/96	13:00
9	A6D260120-008	GW-3482-JOS-042396-08	4/23/96	13:45
D	A6D260120-009	GW-3482-JOS-042396-09	4/23/96	18:00
E	A6D260120-010	GW-3482-JOS-042396-10	4/23/96	18:15
F	A6D260120-011	GW-3482-JOS-042496-11	4/24/96	11:00
G	A6D260120-012	GW-3482-JOS-042496-12	4/24/96	11:30
J	A6D260120-013	GW-3482-JOS-042496-13	4/24/96	15:30
K	A6D260120-014	GW-3482-JOS-042496-14	4/24/96	16:00
L	A6D260120-015	GW-3482-JOS-042496-15	4/24/96	18:30
M	A6D260120-016	SW-3482-JOS-042496-01	4/24/96	18:00

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042296-02

) # : C3T80
AB # : A6D260120-002
ATRIX: WATER

DATE SAMPLED : 4/22/96
TIME SAMPLED : 16:30
DATE RECEIVED: 4/26/96

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
eryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
admium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
hromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
anganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115

E: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042296-01

WO # : C3T7X
LAB # : A6D260120-001
MATRIX: WATER

DATE SAMPLED : 4/22/96
TIME SAMPLED : 16:00
DATE RECEIVED: 4/26/96

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042296-04

IO #	: C3T82	DATE SAMPLED :	4/22/96
LAB #	: A6D260120-004	TIME SAMPLED :	18:30
MATRIX:	WATER	DATE RECEIVED:	4/26/96

\- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115

TE: AS RECEIVED

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042296-03

WO # : C3T81		**DATE SAMPLED :**	4/22/96
LAB # : A6D260120-003		**TIME SAMPLED :**	17:15
MATRIX: WATER		**DATE RECEIVED:**	4/26/96

\- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115

NOTE: AS RECEIVED

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042396-05

WO # : C3T83
LAB # : A6D260120-005
MATRIX: WATER

DATE SAMPLED : 4/23/96
TIME SAMPLED : 9:30
DATE RECEIVED: 4/26/96

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	**4,180**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042396-06 (MS/MSD)

O # : C3T85
AB # : A6D260120-006
ATRIX: WATER

DATE SAMPLED : 4/23/96
TIME SAMPLED : 9:30
DATE RECEIVED: 4/26/96

REQUESTED METALS

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
.ead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
eryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
:admium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
hromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
langanese	305	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115

TE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc., Ltd.

GW-3482-JOS-042396-09

WO # : C3T8D
LAB # : A6D260120-009
MATRIX: WATER

DATE SAMPLED : 4/23/96
TIME SAMPLED : 18:00
DATE RECEIVED: 4/26/96

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042396-10

) # : C3T8E
AB # : A6D260120-010
ATRIX: WATER

DATE SAMPLED : 4/23/96
TIME SAMPLED : 18:15
DATE RECEIVED: 4/26/96

- REQUESTED METALS -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
eryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
admium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
hromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
anganese	**4,920**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

TE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042496-13

WO # : C3T8J
LAB # : A6D260120-013
MATRIX: WATER

DATE SAMPLED : 4/24/96
TIME SAMPLED : 15:30
DATE RECEIVED: 4/26/96

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	**5,120**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042496-14

) # : C3T8K
AB # : A6D260120-014
ATRIX: WATER

DATE SAMPLED : 4/24/96
TIME SAMPLED : 16:00
DATE RECEIVED: 4/26/96

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
eryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
admium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
hromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
anganese	15.6	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115

)TE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042496-11

IO #	: C3T8F	**DATE SAMPLED** :	4/24/96
LAB #	: A6D260120-011	**TIME SAMPLED** :	11:00
MATRIX:	WATER	**DATE RECEIVED**:	4/26/96

\- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	**252**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

NOTE: AS RECEIVED

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042496-12

ɔ # : C3T8G
AB # : A6D260120-012
ATRIX: WATER

DATE SAMPLED : 4/24/96
TIME SAMPLED : 11:30
DATE RECEIVED: 4/26/96

\- REQUESTED METALS -

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ead	**3.6**	**3.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**
eryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
admium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
hromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
langanese	**70.0**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

ɪTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042496-15

WO # : C3T8L
LAB # : A6D260120-015
MATRIX: WATER

DATE SAMPLED : 4/24/96
TIME SAMPLED : 18:30
DATE RECEIVED: 4/26/96

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	**11.3**	**3.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	**398**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**
Manganese	**274**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

SW-3482-JOS-042496-01

) # :	C3T8M	DATE SAMPLED :	4/24/96
AB # :	A6D260120-016	TIME SAMPLED :	18:00
ATRIX:	WATER	DATE RECEIVED:	4/26/96

REQUESTED METALS

ARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
ead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
luminum	ND	200	ug/L	SW846 6010A	5/01- 5/06/96	6122115
hromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
opper	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
ickel	ND	40.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
.nc	23.4	20.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115

T... : RECEIVED

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental
Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTOL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. All other organic analyte concentrations must be below the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When evaluating the MS/MSD data, special attention is given to the RPD values. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If, in the analyst's judgment, sample matrix effects are indicated, no corrective action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria. All other organic analytical methods require every surrogate recovery to be within the established control limit. If the LCS or the Method Blank surrogates fail to meet recovery criteria, the entire batch of samples is reprepared and reanalyzed. If the surrogates in an environmental sample do not meet the recovery criteria, only the sample is reprepared and reanalyzed to confirm the matrix effect.

Quanterra
Environmental
Services

CHECK SAMPLE REPORT

LAB #: A6D260120

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:6122115		
luminum	101	(80-120)	5/01- 5/06/96
eryllium	96	(80-120)	5/01- 5/06/96
admium	104	(80-120)	5/01- 5/06/96
hromium	104	(80-120)	5/01- 5/06/96
opper	95	(80-120)	5/01- 5/06/96
anganese	98	(80-120)	5/01- 5/06/96
ickel	100	(80-120)	5/01- 5/06/96
[illegible]	103	(80-120)	5/01- 5/06/96
[illegible]	102	(80-120)	5/01- 5/06/96

Quanterra
Environmental
Services

METHOD BLANK REPORT

LAB #: A6D260120

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:6122115			
Aluminum	ND	200	ug/L	SW846 6010A	5/01- 5/06/96
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96
Copper	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96
Nickel	ND	40.0	ug/L	SW846 6010A	5/01- 5/06/96
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96
Zinc	ND	20.0	ug/L	SW846 6010A	5/01- 5/06/96

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

MATRIX SPIKE REPORT

LAB #: A6D260120-006

METALS

MPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:6122115 MATRIX: WATER					
ryllium	96	96	(80-120)	0.56	(0-20)	5/01- 5/06/96
dmium	104	104	(80-120)	0.63	(0-20)	5/01- 5/06/96
romium	103	103	(80-120)	0.54	(0-20)	5/01- 5/06/96
nganese	100	97	(80-120)	1.9	(0-20)	5/01- 5/06/96
ad	102	103	(80-120)	0.43	(0-20)	5/01- 5/06/96

TE:

ations are performed before rounding to avoid round-off errors in calculated results

Quanterra
Environmental
Services

METALS SPIKE REPORT

WATER - ICP

------------------------------METALS------------------------------

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE DUPE PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE	SAMPLE ID
Silver	98	99	(80-120)	1.2	20	04/09/-04/09/96	C3KQ3
Aluminum	106	109	(80-120)	2.7	20	04/03-04/08/96	C3H6H
Arsenic	113	114	(80-120)	1.3	20	04/03-04/08/96	C3GCK
Boron	93	96	(80-120)	3.0	20	03/22-03/26/96	C3CLH
Barium	101	101	(80-120)	0.0	20	04/03-04/08/96	C3H6H
Beryllium	103	102	(80-120)	0.4	20	04/03-04/08/96	C3H6H
Calcium	101	97	(80-120)	1.3	20	04/03-04/08/96	C3H6H
Cadmium	110	109	(80-120)	0.9	20	04/03-04/09/96	C3H6H
Cobalt	101	100	(80-120)	1.2	20	04/03-04/08/96	C3H6H
Chromium	89	92	(80-120)	4.0	20	04/09-04/09/96	C3KQ3
Copper	84	88	(80-120)	5.4	20	04/09-04/09/96	C3KQ3
Iron	94	93	(80-120)	0.1	20	04/03-04/08/96	C3H6H
Potassium	100	100	(80-120)	0.1	20	04/03-04/08/96	C3H6H
Magnesium	105	104	(80-120)	0.8	20	04/03-04/09/96	C3G75
Manganese	98	93	(80-120)	1.2	20	04/03-04/08/96	C3H6H
Molybdenum	112	111	(80-120)	1.1	20	03/22-03/24/96	C3CLH
Sodium	101	101	(80-120)	0.5	20	04/03-04/08/96	C3H6H
Nickel	101	99	(80-120)	2.3	20	04/03-04/08/96	C3H6H
Lead	102	103	(80-120)	1.3	20	04/01-04/01/96	C3G5V
Antimony	105	102	(80-120)	2.9	20	04/03-04/08/96	C3H6H
Selenium	116	118	(80-120)	1.6	20	04/03-04/08/96	C3GCK
Tin	105	104	(80-120)	0.4	20	03/06-03/11/96	C3729
Thallium	101	104	(80-120)	2.8	20	04/03-04/09/96	C3H6H
Vanadium	101	101	(80-120)	0.4	20	04/03-04/08/96	C3H6H
Zinc	98	98	(80-120)	0.2	20	04/03-04/08/96	C3H6H

CRA
ONESTOGA-ROVERS & ASSOCIATES, INC.
351 Oakbrook Drive Suite 150
orcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	Lead	~~Aluminum~~	~~Copper~~	~~Nickel~~	~~Zinc~~ JS	REMARKS
	4/22/96	1600	GW-3482-JOS-042296-01	G.W.	1	X	X	X	X	X					
	4/22/96	1630	GW-3482-JOS-042296-02		1										
		1715	GW-3482-JOS-042296-03		1										
		1830	GW-3482-JOS-042296-04		1										
	4/23/96	0930	GW-3482-JOS-042396-05		1										
		0930	GW-3482-JOS-042396-06 MS/MSD		2										
		1300	GW-3482-JOS-042396-07		1										
		1345	GW-3482-JOS-042396-08		1										
		1800	GW-3482-JOS-042396-09		1										
		1815	GW-3482-JOS-042396-10		1										
	4/24/96	1100	GW-3482-JOS-042496-11		1										
		1130	GW-3482-JOS-042496-12		1										
		1530	GW-3482-JOS-042496-13		1										
		1600	GW-3482-JOS-042496-14		1										
		1830	GW-3482-JOS-042496-15		1										

TOTAL NUMBER OF CONTAINERS: 16

RELINQUISHED BY: ① [signature]	DATE: 4/25/96 TIME: 1200	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED Ex 4/1

AIR BILL NUMBER:

SAMPLE TEAM: JS [signature]

RECEIVED FOR LABORATORY BY: [signature]

White - Fully Executed Copy

00022

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Aluminum	Chromium	Copper	Lead	Nickel	Zinc				REMARKS
	4/24/96	1800	SW-3482-JDS-042496-01	SW	1										
			1 TEMP. BLANK												
TOTAL NUMBER OF CONTAINERS					1	17 TOTAL									

RELINQUISHED BY: ① [signature] DATE: TIME:
RECEIVED BY: ② DATE: TIME:

RELINQUISHED BY: ② DATE: TIME:
RECEIVED BY: ③ DATE: TIME:

RELINQUISHED BY: ③ DATE: TIME:
RECEIVED BY: ④ DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER:

White · Fully Executed Copy
Yellow eceiving Laboratory Copy
...ar ...opy

SAMPLE TEAM: [signature]

RECEIVED FOR LABORATORY BY: Doris Nelson

MEMO

TO:	Joanne Staubitz	REFERENCE NO:	3482
FROM:	Ellen Stilwell/ev/19	DATE:	May 28, 1996

RE: Data Quality Assurance Evaluation
Quarterly Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Thirteen groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia between April 22 and April 24, 1996. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results received in a report (No. A6D260120) obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were received in a report provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Final Update IIB, January 1995. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection dates noted in the chain-of-custody document and the sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSIS

A method blank sample was used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in the blank analyzed in conjunction with the analyzed samples. Data qualifications were not required on the basis of blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

A laboratory check sample was analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

1 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSIS

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries fell within laboratory-established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20, indicating acceptable method precision. Data qualifications were not required on this basis.

2.5 RINSE BLANK ANALYSIS

Rinse blank analyses were used to determine the efficiency of field decontamination procedures conducted during this sampling event. One rinse blank sample (GW-3482-JOS-042296-01) was collected and submitted for analyses.

The rinsate blank was free of target analytes, indicating effective decontamination procedures occurred during sampling. Thus, no data qualifications were necessary on this basis.

2.6 FIELD DUPLICATE ANALYSIS

Field duplicate samples are used as an indication of field and analytical reproducibility. Field duplicate results are compared and assessed based on the RPD calculated for each pair of duplicate results.

The pair of samples collected as field duplicates did not contain any detectable levels of target analytes; thus, their usefulness in determining precision cannot be assessed.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

Quanterra
Environmental
Services

Rec'd CRA
AUG 13 1996

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL
Lot#: A6G130114

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Brian M. Greenwell
Project Manager

August 2, 1996

Quanterra
Environmental
Services

CASE NARRATIVE

e following report contains the analytical results for eleven water samples submitted to anterra-North Canton by Conestoga-Rovers & Associates. Inc. from the Cedartown Municipal ndfill Site. project number 3482. The samples were received July 13. 1996. according to cumented sample acceptance procedures.

ianterra utilizes only USEPA approved methods and instrumentation in all analytical work. The nples presented in this report were analyzed for the parameters listed on the following page in cordance with the methods indicated.. Results were provided by facsimile transmission to anne Staubitz on July 22. 1996.

ie results included in this report have been reviewed for compliance with the laboratory QA/QC an All data have been found to be compliant with the exception of those items noted.

imples "GW-3482-071096-JOS-08" and "GW-3482-071196-JOS-10" were received with mple container lids off. No sample was available for analysis and therefore. are not included in is report.

Quanterra Environmental Services

ANALYTICAL METHODS SUMMARY

A6G130114

PARAMETER	METHOD
Inductively Coupled Plasma (ICP) Metals	MCAWW 200.7
Trace Inductively Coupled Plasma (ICP) Metals	MCAWW 200.7

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

Quanterra Environmental Services

lytical results of the samples listed below are presented on the following pages.

CT-SAMPLE #	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	
.6G130114-001	GW-3482-070996-JOS-01	07/09/96	17:15
.6G130114-002	GW-3482-070996-JOS-02	07/09/96	18:45
.6G130114-003	GW-3482-071096-JOS-03	07/10/96	09:00
.6G130114-004	GW-3482-071096-JOS-04	07/10/96	10:30
.6G130114-005	GW-3482-071096-JOS-05 (MS/MSD)	07/10/96	10:40
.6G130114-006	GW-3482-071096-JOS-06	07/10/96	14:40
.6G130114-007	GW-3482-071096-JOS-07	07/10/96	15:00
.6G130114-008	GW-3482-071096-JOS-09	07/10/96	17:00
.6G130114-009	GW-3482-071196-JOS-11	07/11/96	11:00
.6G130114-010	GW-3482-071196-JOS-12	07/11/96	12:45
.6G130114-011	SW-3482-071196-JOS-01	07/11/96	15:00

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-070996-JOS-01

TOTAL Metals

ample #.: A6G130114 - 001 Work Order #.: C4RP7 Matrix.......: WATER
Sampled.: 07/09/96 17:15 Date Received: 07/13/96 10:00

[illegible]TER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
[illegible]um	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
[illegible]	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
[illegible]um	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
nese	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

lations are performed before rounding to avoid round-off errors in calculated results.

[illegible] ameter was not detected at or above the stated reporting limit.

COMESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-070996-JOS-02

TOTAL Metals

le #.: A6G130114 - 002 Work Order #.: C4RPD Matrix.......: WATER
pled.: 07/09/96 18:45 Date Received: 07/13/96 10:00

R	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
um	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
n	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
se	3330	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

:

ns are performed before rounding to avoid round-off errors in calculated results.

meter was not detected at or above the stated reporting limit.

Quanterra Environmental Services

COMESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-071096-JOS-03

TOTAL Metals

ample #.: A6G130114 - 003   Work Order #.: C4RPG   Matrix.......: WATER
S-mpled.: 07/10/96 09:00   Date Received: 07/13/96 10:00

I ER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
um	ND	5.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
	ND	5.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
m	42.9	10.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
ese	15.0	10.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167

(...

ons are performed before rounding to avoid round-off errors in calculated results.

ameter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-071096-JOS-04

TOTAL Metals

e #.: A6G130114 - 004 Work Order #.: C4RPJ Matrix.......: WATER
led.: 07/10/96 10:30 Date Received: 07/13/96 10:00

:	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
a	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
e	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

are performed before rounding to avoid round-off errors in calculated results.

ery was not detected at or above the stated reporting limit.

COMESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-071096-JOS-05 (MS/MSD)

TOTAL Metals

Sample #.: A6G130114 - 005 Work Order #.: C4RPL Matrix.......: WATER
ampled.: 07/10/96 10:40 Date Received: 07/13/96 10:00

M TER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
i ium	ND	5.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
m	ND	5.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
um	ND	10.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
ese	225	10.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167

(s):

ions are performed before rounding to avoid round-off errors in calculated results.

rameter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC., LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-071096-JOS-06

TOTAL Metals

le #.: A6G130114 - 006 Work Order #.: C4RPT Matrix.......: WATER
pled.: 07/10/96 14:40 Date Received: 07/13/96 10:00

R	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
m	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
.	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
ie	778	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

s are performed before rounding to avoid round-off errors in calculated results.

cter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-071096-JOS-07

TOTAL Metals

Sample #.: A6G130114 - 007 Work Order #.: C4RPX Matrix.......: WATER
Sampled.: 07/10/96 15:00 Date Received: 07/13/96 10:00

TER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
ium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
m	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
um	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
nese	782	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

:S:

. tions are performed before rounding to avoid round-off errors in calculated results.

rameter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-071096-JOS-09

TOTAL Metals

e #.: A6G130114 - 008 Work Order #.: C4RQ1 Matrix.......: WATER
led.: 07/10/96 17:00 Date Received: 07/13/96 10:00

	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
ı	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
e	21.4	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

. are performed before rounding to avoid round-off errors in calculated results.

ter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC., LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-071196-JOS-11

TOTAL Metals

-Sample #.: A6G130114 - 009 Work Order #.: C4RQ2 Matrix.......: WATER
e Sampled.: 07/11/96 11:00 Date Received: 07/13/96 10:00

ETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
ɔ	ND	3.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
y llium	ND	5.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
ɪ um	ND	5.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
mium	ND	10.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167
ganese	5300	10.0 Dilution Fact: 1	ug/L	SW846 6010A	07/16-07/17/96	6198167

S

...ulations are performed before rounding to avoid round-off errors in calculated results.

D ...arameter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-071196-JOS-12

TOTAL Metals

le #.: A6G130114 - 010   Work Order #.: C4RQ4   Matrix.......: WATER
pled.: 07/11/96 12:45   Date Received: 07/13/96 10:00

R	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
m	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
n	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
se	124	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

:

...s are performed before rounding to avoid round-off errors in calculated results.

...meter was not detected at or above the stated reporting limit.

COMESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: SW-3482-071196-JOS-01

TOTAL Metals

Sample #.: A6G130114 - 011   Work Order #.: C4RQ7   Matrix.......: WATER
Sampled.: 07/11/96 15:00   Date Received: 07/13/96 10:00

TER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
um	ND	200	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
um	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
i	ND	40.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
	24.7	20.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

):

ulations are performed before rounding to avoid round-off errors in calculated results.

rameter was not detected at or above the stated reporting limit.

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental
Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable. Consultation with the client should take place.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. All other organic analyte concentrations must be below the reporting limits. The listed ...ls may be present in concentrations up to 2 times the reporting limit or must be twenty folds less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When evaluating the MS/MSD data, special attention is given to the RPD values. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If, in the analyst's judgment, sample matrix effects are indicated, no corrective action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

...e Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate ...mpounds meet acceptance criteria. All other organic analytical methods require every surrogate recovery to be within the established control limit. The acceptance criteria does not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed. If the surrogates in an environmental sample do not meet the recovery criteria, only the sample is reprepared and reanalyzed to confirm the matrix effect.

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

Metals

Client Lot #: A6G130114 **Matrix:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #: 6198167					
Chromium	106 Dilution Factor: 1	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T10A
Manganese	103 Dilution Factor: 1	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T106
Lead	102 Dilution Factor: 1	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T107
Beryllium	104 Dilution Factor: 1	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T108
Cadmium	105 Dilution Factor: 1	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T109
Nickel	104 Dilution Factor: 1	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T11A
Zinc	113 Dilution Factor: 1	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T11C
Aluminum	108 Dilution Factor: 1	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T118
Copper	98 Dilution Factor: 1	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T119

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra

Environmental
Services

METHOD BLANK REPORT

Metals

Lot #: A6G130114 **Matrix:** WATER

der #: C4T7T **Prep Date:** 07/16/96 **Prep Batch #:** 6198167

ER	RESULT	REPORTING LIMIT	UNITS	METHOD	ANALYSIS DATE	DIL FACT
se	ND	0.015	mg/L	SW846 6010A	07/17/96	1
	ND	0.0030	mg/L	SW846 6010A	07/17/96	1
um	ND	3.0	ug/L	SW846 6010A	07/17/96	1
:	ND	5.0	ug/L	SW846 6010A	07/17/96	1
m	ND	10.0	ug/L	SW846 6010A	07/17/96	1
m	ND	200	ug/L	SW846 6010A	07/17/96	1
	ND	0.010	mg/L	SW846 6010A	07/17/96	1
	ND	40.0	ug/L	SW846 6010A	07/17/96	1
	ND	20.0	ug/L	SW846 6010A	07/17/96	1

:

s are performed before rounding to avoid round-off errors in calculated results.

ster was not detected at or above the stated reporting limit.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #: A6G130114 MS Sample: A6G130114-005 Matrix: WATER

METER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	BATCH #
:. iese	100	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	101	(80-120)	0.86	(0-20)	SW846 6010A	07/16-07/17/96	6198167
	Dilution Factor: 1						
i	100	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	101	(80-120)	0.90	(0-20)	SW846 6010A	07/16-07/17/96	6198167
	Dilution Factor: 1						
·illium	104	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	104	(80-120)	0.46	(0-20)	SW846 6010A	07/16-07/17/96	6198167
	Dilution Factor: 1						
··um	106	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	107	(80-120)	1.2	(0-20)	SW846 6010A	07/16-07/17/96	6198167
	Dilution Factor: 1						
:	110	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	110	(80-120)	0.17	(0-20)	SW846 6010A	07/16-07/17/96	6198167
	Dilution Factor: 1						

3(S): ______

...tions are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental
Services

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

ient Lot #: A6G130114 **MS Sample:** A6G130114-005 **Matrix:** WATER

?	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	BATCH #
e	100	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	101	(80-120)	0.86	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
	100	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	101	(80-120)	0.90	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
m	104	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	104	(80-120)	0.46	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
	106	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	107	(80-120)	1.2	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
n	110	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	110	(80-120)	0.17	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					

:

...e performed before rounding to avoid round-off errors in calculated results.

Norcross, [illegible] 30093

.04-4 .. .027

CHAIN OF CUSTODY RECORD | 3482

CEDARTOWN MUNICIPAL LANDFILL S

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: John Schwaller

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese	Aluminum	Copper	Nickel	Zinc	REMARKS
	7/9/96	1715	GW-3482-070996-JSS-01	GW	1	X	X	X	X	X					STANDARD T/A
	↓	1845	GW-3482-070996-JSS-02	GW	1										
	7/10/96	0900	GW-3482-071096-JSS-03	↓	1										
		1030	GW-3482-071096-JSS-04		1										
		1040	GW-3482-071096-JSS-05MS/MSD		2										
		1440	GW-3482-071096-JSS-06		1										
		1500	GW-3482-071096-JSS-07		1										
		1530	GW-3482-071096-JSS-08		1										
	↓	1700	GW-3482-071096-JSS-09		1										
	7/11/96	0845	GW-3482-071196-JSS-10		1										
		1100	GW-3482-071196-JSS-11		1										
		1245	GW-3482-071196-JSS-12	↓	1										
	↓	1500	SW-3482-071196-JSS-01	SW	1			X	X		X	X	X	X	
			TEMP BLANK	W	1										

TOTAL NUMBER OF CONTAINERS: 15

RELINQUISHED BY: ① [signature]	DATE: TIME:	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER, MIKE REINHARDT

RECEIVED FOR LABORATORY BY: Sue Gooch

DATE: 7.13.96 TIME: 10:00

№ 0333

1007(FORMS) — DEC 6 93 — REVD — (AF-01)

Quanterra
Environmental
Services

Quanterra Incorporated
[illegible] el Drive, NW
[illegible] ...nton, Ohio 44720

) 497-9396 Telephone
) 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN
Lot#: A6G270104

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Brian M. Greenwell
Project Manager

August 14, 1996

Quanterra
Environmental Services

CASE NARRATIVE

The following report contains the analytical results for two water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Facility, project number 3482. The samples were received July 27, 1996, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated..

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

A6G270104

PARAMETER	METHOD
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

Quanterra
Environmental
Services

analytical results of the samples listed below are presented on the following pages.

:_	LOT-SAMPLE #	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	
:	A6G270104-001	GW-3482-JOS-072696-01	07/26/96	00:00
:N	A6G270104-002	GW-3482-JOS-072696-02	07/26/96	00:00

CONESTOGA-ROVERS & ASSOC., LTD.

Quanterra
Environmental Services

Client Sample ID: GW-3482-JOS-072696-01

TOTAL Metals

ple #.: A6G270104 - 001 **Work Order #.:** C51EM **Matrix.......:** WATER
mpled.: 07/26/96 00:00 **Date Received:** 07/27/96

ER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
ium	ND	5.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
n	ND	5.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
um	10.4	10.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
ese	16.4	10.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				

)

ions are performed before rounding to avoid round-off errors in calculated results.
rameter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC., LTD.

Quanterra
Environmental Services

Client Sample ID: GW-3482-JOS-072696-02

TOTAL Metals

ample #.: A6G270104 - 002 Work Order #.: C51EN Matrix.......: WATER
Sampled.: 07/26/96 00:00 Date Received: 07/27/96

ETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
	ND	3.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
um	ND	5.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
	ND	5.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
um	ND	10.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
nese	32.3	10.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				

lations are performed before rounding to avoid round-off errors in calculated results.

meter was not detected at or above the stated reporting limit.

Quanterra

Environmental Services

QUALITY CONTROL SECTION

Quanterra

Environmental Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable. Consultation with the client should take place.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. All other organic analyte concentrations must be below the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty folds less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When evaluating the MS/MSD data, special attention is given to the RPD values. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If, in the analyst's judgment, sample matrix effects are indicated, no corrective action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria. All other organic analytical methods require every surrogate recovery to be within the established control limit. The acceptance criteria does not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed. If the surrogates in an environmental sample do not meet the recovery criteria, only the sample is reprepared and reanalyzed to confirm the matrix effect.

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

Metals

Client Lot #: A6G270104 **Matrix:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #: 6214121					
Chromium	108	(80-120)	SW846 6010A	08/01-08/02/96	C52VP10T
	Dilution Factor: 1				
Beryllium	102	(80-120)	SW846 6010A	08/01-08/02/96	C52VP11G
	Dilution Factor: 1				
Cadmium	109	(80-120)	SW846 6010A	08/01-08/02/96	C52VP11H
	Dilution Factor: 1				
Manganese	102	(80-120)	SW846 6010A	08/01-08/02/96	C52VP110
	Dilution Factor: 1				
Lead	105	(80-120)	SW846 6010A	08/01-08/02/96	C52VP118
	Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra

Environmental Services

METHOD BLANK REPORT

TOTAL Metals

:ot #: A6G270104

Matrix: WATER

ier #: C52VP Prep Date: 08/01/96 Prep Batch #: 6214121

ER	RESULT	REPORTING LIMIT	UNITS	METHOD	ANALYSIS DATE	DIL FACT
	ND	3.0	ug/L	SW846 6010A	08/02/96	1
um	ND	5.0	ug/L	SW846 6010A	08/02/96	1
	ND	5.0	ug/L	SW846 6010A	08/02/96	1
n	ND	10.0	ug/L	SW846 6010A	08/02/96	1
se	ND	10.0	ug/L	SW846 6010A	08/02/96	1

:

are performed before rounding to avoid round-off errors in calculated results.

ter was not detected at or above the stated reporting limit.

Quanterra

Environmental Services

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #: A6G270104 **MS Sample:** A6G270112-001 **Matrix:** WATER

ETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	BATCH #
a :se	97	(80-120)			SW846 6010A	08/01-08/02/96	6214121
	102	(80-120)	4.6	(0-20)	SW846 6010A	08/01-08/02/96	6214121
		Dilution Factor: 1					
n_um	103	(80-120)			SW846 6010A	08/01-08/02/96	6214121
	108	(80-120)	4.7	(0-20)	SW846 6010A	08/01-08/02/96	6214121
		Dilution Factor: 1					
llium	97	(80-120)			SW846 6010A	08/01-08/02/96	6214121
	103	(80-120)	5.0	(0-20)	SW846 6010A	08/01-08/02/96	6214121
		Dilution Factor: 1					
ium	103	(80-120)			SW846 6010A	08/01-08/02/96	6214121
	108	(80-120)	4.8	(0-20)	SW846 6010A	08/01-08/02/96	6214121
		Dilution Factor: 1					
	100	(80-120)			SW846 6010A	08/01-08/02/96	6214121
	105	(80-120)	4.6	(0-20)	SW846 6010A	08/01-08/02/96	6214121
		Dilution Factor: 1					

(S):

c are performed before rounding to avoid round-off errors in calculated results.

CHA' OF CUSTODY RECORD

SAMPLER'S SIGNATURE [signature] PRINTED NAME John Schnaller

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	PARAMETERS: Be	Cd	Cr	Mn	Pb					REMARKS
	7/26/96		GW-3482-JS-072696-01	GW	2	X	X	X	X	X					
	7/26/96		GW-3482-JS-072696-02	GW.	2	X	X	X	X	X					
			TEMP BLANK		1										

TOTAL NUMBER OF CONTAINERS 5

RELINQUISHED BY: ① [signature]	DATE: 7/26/96 TIME:	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: J. SCHNALLER

RECEIVED FOR LABORATORY BY: Kris Brooks

DATE: 72796 TIME: 10:15A

№ 0828

1007(FORMS) — DEC 6, 93 — REV.D — (AF-01)

MEMO

TO: Joanne Staubitz REFERENCE NO: 3482

FROM: Ellen Stilwell/ev/23 DATE: August 23, 1996

RE: Data Quality Assurance Evaluation
Quarterly Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Twelve groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia on July 10, July 11 and July 26, 1996. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results received in two reports (Nos. A6G270104 and A6G130114) obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Final Update IIB, January 1995. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection dates noted in the chain-of-custody document and the sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSIS

Method blank samples are used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in the blanks analyzed in conjunction with the analyzed samples. Data qualifications were not required on the basis of method blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples are analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSIS

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries fell within laboratory-established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20, indicating acceptable method precision. Data qualifications were not required on this basis.

2.5 RINSE BLANK ANALYSIS

Rinse blank analyses are used to determine the efficiency of field decontamination procedures conducted during this sampling event. One rinse blank sample (GW-3482-071096-JOS-03) was collected and submitted for analyses.

Chromium and manganese were detected in the rinse blank at levels of 42.9 µg/L and 15.0 µg/L, respectively. However, these metals were not detected above the reporting limits in the associated investigative sample. Therefore, no data qualifications were necessary on this basis.

2.6 FIELD DUPLICATE ANALYSIS

Field duplicate samples are used as an indication of field and analytical reproducibility. Field duplicate results are compared and assessed based on the RPD calculated for each pair of duplicate results. The RPD must not exceed 30% for water matrix samples.

A pair of samples was collected as field duplicates and the RPD for the compound manganese fell below the criteria, indicating acceptable field and laboratory precision. No other target analytes were detected in the pair of samples. Thus, data qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification, based on the QA/QC criteria.

.30 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL

Lot #: A6J260108

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Michelle M. Daley/FOR
David S. Heakin
Project Manager

November 14, 1996

CASE NARRATIVE

following report contains the analytical results for eleven water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received October 26, 1996, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

A6J260108

PARAMETER	ANALYTICAL METHOD
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

Quanterra Environmental Services

SAMPLE SUMMARY

A6J260108

SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
001	GW-3482-102396-JOS-01	10/23/96	00:0
002	GW-3482-102396-JOS-02 (MS/MSD)	10/23/96	00:0
003	GW-3482-102396-JOS-03	10/23/96	00:0
004	GW-3482-102396-JOS-04	10/23/96	00:0
005	GW-3482-102396-JOS-05	10/23/96	00:0
006	GW-3482-102496-JOS-06	10/24/96	00:0
007	GW-3482-102496-JOS-07	10/24/96	00:0
008	GW-3482-102496-JOS-08	10/24/96	00:0
009	GW-3482-102496-JOS-09	10/24/96	00:0
010	GW-3482-102596-JOS-10	10/25/96	00:0
011	GW-3482-102596-JOS-11	10/25/96	00:0

S):

ytical results of the samples listed above are presented on the following pages.

ulations are performed before rounding to avoid round-off errors in calculated results.

noted as "ND" were not detected at or above the stated limit.

ort must not be reproduced, except in full, without the written approval of the laboratory.

for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor,

ter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

COMESTOGA-ROVERS & ASSOC., LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102396-JOS-01

TOTAL Metals

·Sample #...: A6J260108-001 Matrix.......: WATER
: Sampled...: 10/23/96 00:00 Date Received..: 10/26/96

METER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
) latch #...: 6305106						
i	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9R105
...lium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9R101
...um	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9R102
...ium	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9R103
...nese	19.7	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9R104

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102396-JOS-02 (MS/MSD)

TOTAL Metals

ple #...: A6J260108-002 Matrix.......: WATER
mpled...: 10/23/96 00:00 Date Received..: 10/26/96

ER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
atch #...: 6305106						
	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9T10E
		Dilution Factor: 1				
ium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9T101
		Dilution Factor: 1				
n	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9T104
		Dilution Factor: 1				
m	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9T107
		Dilution Factor: 1				
ese	23.4	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9T10A
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102396-JOS-04

TOTAL Metals

umple #...: A6J260108-004   Matrix.......: WATER
Sampled...: 10/23/96 00:00   Date Received..: 10/26/96

TER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Batch #...: 6305106						
	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9W105
..ium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9W101
..m	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9W102
..um	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9W103
nese	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9W104

Quanterra
Environmental
Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-102396-JOS-03

TOTAL Metals

..mple #...: A6J260108-003 Matrix.......: WATER
e Sampled...: 10/23/96 00:00 Date Received..: 10/26/96

..METER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
) Batch #...: 6305106						
1	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9V105
		Dilution Factor: 1				
.. ium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9V101
		Dilution Factor: 1				
.. m	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9V102
		Dilution Factor: 1				
.. um	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9V103
		Dilution Factor: 1				
.. ese	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9V104
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra
Environmental Services

Client Sample ID: GW-3482-102596-JOS-11

TOTAL Metals

Sample #...: A6J260108-011 Matrix.......: WATER
Sampled...: 10/25/96 00:00 Date Received..: 10/26/96

METER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
atch #...: 6305106						
	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA5105
llium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA5101
ium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA5102
um	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA5103
ese	24.9	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA5104

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra
Environmental
Services

Client Sample ID: GW-3482-102496-JOS-09

TOTAL Metals

Sample #...: A6J260108-009 Matrix.......: WATER
Sampled...: 10/24/96 00:00 Date Received..: 10/26/96

METER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
atch #...: 6305106						
	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA3105
llium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA3101
[illegible]	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA3102
um	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA3103
ese	4520	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA3104

CONESTOGA-ROVERS & ASSOC., LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102596-JOS-10

TOTAL Metals

mple #...: A6J260108-010 Matrix.......: WATER

mpled...: 10/25/96 00:00 Date Received..: 10/26/96

ER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
atch #...: 6305106						
	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA4105
..um	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA4101
n	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA4102
.m	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA4103
ese	2490	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA4104

COMESTOGA-ROVERS & ASSOC., LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102496-JOS-07

TOTAL Metals

-Sample #...: A6J260108-007 Matrix.......: WATER
e Sampled...: 10/24/96 00:00 Date Received..: 10/26/96

AMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Batch #...: 6305106						
d	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA1105
ylium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA1101
r um	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA1102
ium	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA1103
nese	191	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA1104

CONESTOGA-ROVERS & . SOC., LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102496-JOS-08

TOTAL Metals

mple #...: A6J260108-008 Matrix.......: WATER
ampled...: 10/24/96 00:00 Date Received..: 10/26/96

TER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
atch #...: 6305106						
	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA2105
ium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA2101
m	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA2102
ium	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA2103
nese	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA2104

COMESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102396-JOS-05

TOTAL Metals

ample #...: A6J260108-005 Matrix.......: WATER

Sampled...: 10/23/96 00:00 Date Received..: 10/26/96

ETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
tch #...: 6305106						
	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9X105
lium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9X101
[illegible]	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9X102
[illegible]	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9X103
ese	1930	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6G9X104

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102496-JOS-06

TOTAL Metals

mple #...: A6J260108-006 **Matrix.......:** WATER
mpled...: 10/24/96 00:00 **Date Received..:** 10/26/96

TER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
atch #...: 6305106						
	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA0105
ium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA0101
m	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA0102
um	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA0103
nese	**682**	**10.0** Dilution Factor: 1	**ug/L**	**SW846 6010A**	**10/31-11/01/96**	**C6GA0104**

QUALITY CONTROL ELEMENTS OF SW-846 METHODS (continued)

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If in the analyst's judgment, sample matrix effects are indicated and the LCS or LCSD is within acceptance criteria, no correction action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. The MS/DU is evaluated in the same manner as the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, all organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria.

Quanterra
Environmental
Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental and field QC samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

Quanterra Environmental Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

ent Lot #...: A6J260108 Matrix.........: WATER

AMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
ot-Sample#: A6J310000-106 Prep Batch #...: 6305106					
omium	105	(80 - 120) Dilution Factor: 1	SW846 6010A	10/31-11/01/96	C6JC910A
ganese	101	(80 - 120) Dilution Factor: 1	SW846 6010A	10/31-11/01/96	C6JC9106
d	103	(80 - 120) Dilution Factor: 1	SW846 6010A	10/31-11/01/96	C6JC9107
y llium	98	(80 - 120) Dilution Factor: 1	SW846 6010A	10/31-11/01/96	C6JC9108
m um	106	(80 - 120) Dilution Factor: 1	SW846 6010A	10/31-11/01/96	C6JC9109

ia ns are performed before rounding to avoid round-off errors in calculated results.

Quanterra Environmental Services

METHOD BLANK REPORT

TOTAL Metals

..O. #...: A6J260108 Matrix.........: WATER

:R	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Sample #: A6J310000-106 Prep Batch #...: 6305106						
	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6JC9102
		Dilution Factor: 1				
um	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6JC9103
		Dilution Factor: 1				
	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6JC9104
		Dilution Factor: 1				
n	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6JC9105
		Dilution Factor: 1				
se	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6JC9101
		Dilution Factor: 1				

:

re performed before rounding to avoid round-off errors in calculated results.

Quanterra Environmental Services

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

: Lot #...: A6J260108 Matrix.........: WATER
Sampled...: 10/23/96 00:00 Date Received..: 10/26/96

METER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
ot-Sample #: A6J260108-002 Prep Batch #...: 6305106							
	102	(80 - 120)			SW846 6010A	10/31-11/01/96	C6G9T10F
	101	(80 - 120)	1.7	(0-20)	SW846 6010A	10/31-11/01/96	C6G9T10G
		Dilution Factor: 1					
llium	100	(80 - 120)			SW846 6010A	10/31-11/01/96	C6G9T102
	98	(80 - 120)	1.4	(0-20)	SW846 6010A	10/31-11/01/96	C6G9T103
		Dilution Factor: 1					
ium	113	(80 - 120)			SW846 6010A	10/31-11/01/96	C6G9T105
	104	(80 - 120)	7.9	(0-20)	SW846 6010A	10/31-11/01/96	C6G9T106
		Dilution Factor: 1					
.um	104	(80 - 120)			SW846 6010A	10/31-11/01/96	C6G9T108
	102	(80 - 120)	1.4	(0-20)	SW846 6010A	10/31-11/01/96	C6G9T109
		Dilution Factor: 1					
e	100	(80 - 120)			SW846 6010A	10/31-11/01/96	C6G9T10C
	99	(80 - 120)	0.67	(0-20)	SW846 6010A	10/31-11/01/96	C6G9T10D
		Dilution Factor: 1					

S):

ations are performed before rounding to avoid round-off errors in calculated results.

Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: [illegible] PRINTED NAME: [illegible]

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	PARAMETERS					REMARKS
	10/23/96		GW-3482-102396-ES-01	GW	1	X	X	X	X	X	
			GW-3482-102396-ES-02 MS/MSD		2						
			GW-3482-102396-ES-03		1						
			GW-3482-102396-ES-04		1						
			GW-3482-102396-ES-05		1						
	10/24/96		GW-3482-102496-ES-06		1						
			GW-3482-102496-ES-07		1						
			GW-3482-102496-ES-08		1						
			GW-3482-102496-ES-09		1						
	10/25/96		GW-3482-102596-ES-10		1						
			GW-3482-102596-ES-11		1						

TOTAL NUMBER OF CONTAINERS: 12

RELINQUISHED BY: ①	DATE: 10/25/96 TIME:	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: Fed-Ex O/N

AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: J. Schwalker

RECEIVED FOR LABORATORY BY: [signature]

DATE: 961026 TIME: 10:40A

№ 0858

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

Quanterra

Environmental Services

Rec'd CRA

NOV 21 1996

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

Lot #: A6J300121

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

David S. Heakin

David S. Heakin
Project Manager

November 19, 1996

Quanterra
Environmental Services

CASE NARRATIVE

The following report contains the analytical results for two water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates. Inc. from the Cedartown Municipal Landfill Site. project number 3482. The samples were received October 30. 1996. according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on November 12. 1996.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

Quanterra
Environmental Services

ANALYTICAL METHODS SUMMARY

A6J300121

PARAMETER	ANALYTICAL METHOD
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

Quanterra
Environmental
Services

SAMPLE SUMMARY

A6J300121

#	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
WF	001	GW-3482-102896-JOS-12	10/28/96	00:00
WK	002	SW-3482-102896-JOS-01	10/28/96	00:00

E(S):

analytical results of the samples listed above are presented on the following pages.

calculations are performed *before rounding* to avoid round-off errors in calculated results.

ults noted as "ND" were not detected at or above the stated limit.

s report must not be reproduced, except in full, without the written approval of the laboratory.

ults for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor,

nt filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-102896-JOS-12

TOTAL Metals

Lot-Sample #...: A6J300121-001 Matrix.......: WATER
Date Sampled...: 10/28/96 00:00 Date Received..: 10/30/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6309255						
Lead	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWF105
Beryllium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWF101
Cadmium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWF102
Chromium	16.2	10.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWF103
Manganese	296	10.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWF104

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: SW-3482-102896-JOS-01

TOTAL Metals

-Sample #...: A6J300121-002 Matrix.......: WATER
e Sampled...: 10/28/96 00:00 Date Received..: 10/30/96

AMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
p Batch #...: 6309255						
minum	ND	200 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWK102
ad	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWK101
romium	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWK103
pper	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWK104
ckel	ND	40.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWK105
n	22.1	20.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6HWK106

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental and field QC samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

QUALITY CONTROL ELEMENTS OF SW-846 METHODS (continued)

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If in the analyst's judgment, sample matrix effects are indicated and the LCS or LCSD is within acceptance criteria, no correction action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. The MS/DU is evaluated in the same manner as the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, all organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria.

Quanterra Environmental Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

ent Lot #...: A6J300121 　　　　Matrix.........: WATER

AMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Lot-Sample#: A6K040000-255 Prep Batch #...: 6309255					
mium	98	(80 - 120) Dilution Factor: 1	SW846 6010A	11/05-11/06/96	C6LT110F
omium	99	(80 - 120) Dilution Factor: 1	SW846 6010A	11/05-11/06/96	C6LT110G
:ganese	99	(80 - 120) Dilution Factor: 1	SW846 6010A	11/05-11/06/96	C6LT112N
:kel	95	(80 - 120) Dilution Factor: 1	SW846 6010A	11/05-11/06/96	C6LT112P
:c	96	(80 - 120) Dilution Factor: 1	SW846 6010A	11/05-11/06/96	C6LT112U
ad	96	(80 - 120) Dilution Factor: 1	SW846 6010A	11/05-11/06/96	C6LT112V
uminum	94	(80 - 120) Dilution Factor: 1	SW846 6010A	11/05-11/06/96	C6LT1131
ryllium	94	(80 - 120) Dilution Factor: 1	SW846 6010A	11/05-11/06/96	C6LT1133
pper	92	(80 - 120) Dilution Factor: 1	SW846 6010A	11/05-11/06/96	C6LT1136

TE(S):

culations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

METHOD BLANK REPORT

TOTAL Metals

lient Lot #...: A6J300121 | Matrix.........: WATER

B Lot-Sample #: A6K040000-255 Prep Batch #...: 6309255

AMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
minum	ND	200 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6LT1117
ad	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6LT1113
ryllium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6LT1119
dmium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6LT1106
Chromium	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6LT1107
Copper	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6LT111D
Manganese	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6LT110V
Nickel	ND	40.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6LT110W
nc	ND	20.0 Dilution Factor: 1	ug/L	SW846 6010A	11/05-11/06/96	C6LT1112

TE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

nt Lot #...: A6J300121 Matrix.........: WATER
Sampled...: 10/26/96 10:00 Date Received..: 10/29/96

METER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
ot-Sample #: A6J290120-001 Prep Batch #...: 6309255							
llium	96	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F133
	96	(80 - 120)	0.04	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F134
		Dilution Factor: 1					
ium	98	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F10U
	98	(80 - 120)	0.29	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F10V
		Dilution Factor: 1					
mium	102	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F10W
	101	(80 - 120)	1.0	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F10X
		Dilution Factor: 1					
per	98	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F13D
	96	(80 - 120)	2.1	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F13E
		Dilution Factor: 1					
d	97	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F12N
	97	(80 - 120)	0.19	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F12P
		Dilution Factor: 1					
ganese	102	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F123
	102	(80 - 120)	0.67	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F124
		Dilution Factor: 1					
kel	95	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F126
	94	(80 - 120)	0.46	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F127
		Dilution Factor: 1					
c	104	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F12K
	101	(80 - 120)	2.6	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F12L
		Dilution Factor: 1					

E(S):

lations are performed before rounding to avoid round-off errors in calculated results.

CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

Quanterra

REFERENCE NUMBER: 3482

PROJECT NAME: Cedartown Mun. Landfill

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: John Schwaner

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Ba	Cd	Cr	Hg	Pb	Al	Cu	Ni	Zinc	REMARKS
	10/28/96		GW-3482-102896-JDS-12	GW	1	X	X	X	X	X					
	↓		SW-3482-102896-JDS-01	SW	1			X		X	X	X	X	X	

TOTAL NUMBER OF CONTAINERS: 2

RELINQUISHED BY: ① [signature]	DATE: 10/29/96 TIME: 0800	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 360 5432 056

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: J. Schwaner

RECEIVED FOR LABORATORY BY: [signature]

DATE: 10-30-96 TIME: 10:55

№ 0373

MEMO

TO: Joanne Toth REFERENCE NO: 3482

FROM: Ellen Stilwell/ev/25 DATE: November 22, 1996

RE: Data Quality Assurance Evaluation
Quarterly Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Twelve groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia on October 23, October 24, October 25 and October 28, 1996. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results received in two reports (Nos. A6J60108 and A6J300121) obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Final Update IIB, January 1995. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection dates noted in the chain-of-custody document and the sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications are not necessary on this basis.

2.2 METHOD BLANK ANALYSIS

Method blank samples are used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in the blanks analyzed in conjunction with the analyzed samples. Data qualifications are not required on the basis of method blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples are analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. All LCS recoveries fell within the laboratory-established control limits of 80 to 120 percent. Data qualifications are not required on this basis.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSIS

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries for metal analyses fell within laboratory-established control limits of 80 to 120 percent, indicating acceptable method accuracy. Recoveries for chloride and sulfate fell within laboratory-established control limits of 90 to 110 percent with two exceptions. MSD recoveries for chloride fell slightly below the control limits (89%). As these data alone do not give a complete indication of overall accuracy and precision, and all other QC data is acceptable, data qualifications are deemed unnecessary on this basis. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20, indicating acceptable method precision. Therefore, data qualifications are not required on this basis.

2.5 RINSE BLANK ANALYSIS

Rinse blank analyses are used to determine the efficiency of field decontamination procedures conducted during this sampling event. One rinse blank sample (GW-3482-091097-JOS-09) was collected and submitted for the analyses.

Target compounds were not detected in the rinse blank with the exception of the parameters sodium, zinc, chloride and sulfate. Since the results of these parameters for certain samples were less than five times the rinsate blank result, these detected results should be qualified as estimated (J). Required qualifications are listed in Table 1.

2.6 FIELD DUPLICATE ANALYSIS

Field duplicate samples are used as an indication of field and analytical reproducibility. Field duplicate results are compared and assessed based on the

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification, based on the QA/QC criteria.

Quanterra
Environmental Services

Quanterra Incorporated
4101 Shuffel Drive NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

Rec'd CPA

MAR 04 1997

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN

Lot #: A7B190119

Joanne Toth

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Kae E. Yoder
Project Manager

March 3, 1997

CASE NARRATIVE

The following report contains the analytical results for three water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates. Inc. from the Cedartown Site, project number 3482. The samples were received February 19. 1997. according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Toth and Neil Pickard on March 3, 1997. A summary of QC data for these analyses is included at the rear of the report.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

Supplemental QC Information

Metals

Manganese is present in the method blank associated with QC batch 7051123 at 14.0 ug/L. Because this analyte is present at a level that is less than 5% of the sample amount, corrective action is not required.

ANALYTICAL METHODS SUMMARY

A7B190119

PARAMETER	ANALYTICAL METHOD
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A7B190119

	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
7	001	GW-3482-021797-NP-11	02/17/97	00:00
3	002	GW-3482-021797-NP-12	02/17/97	00:00
9	003	GW-3482-021897-NP-13	02/18/97	00:00

(S):

alytical results of the samples listed above are presented on the following pages.

culations are performed before rounding to avoid round-off errors in calculated results.

s noted as "ND" were not detected at or above the stated limit.

eport must not be reproduced, except in full, without the written approval of the laboratory.

s for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, ilter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-021797-NP-11

TOTAL Metals

ot-Sample #...: A7B190119-001 Matrix.......: WATER
a e Sampled...: 02/17/97 00:00 Date Received..: 02/19/97

ARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
i_p Batch #...: 7051123						
ead	ND	3.0	ug/L	SW846 6010A	02/20-02/21/97	C8747105
		Dilution Factor: 1				
eryllium	ND	5.0	ug/L	SW846 6010A	02/20-02/21/97	C8747101
		Dilution Factor: 1				
admium	ND	5.0	ug/L	SW846 6010A	02/20-02/21/97	C8747102
		Dilution Factor: 1				
omium	ND	10.0	ug/L	SW846 6010A	02/20-02/21/97	C8747103
		Dilution Factor: 1				
iganese	4330 MBB	10.0	ug/L	SW846 6010A	02/20-02/21/97	C8747104
		Dilution Factor: 1				

(S):

analyte is present at a reportable level in the associated method blank but is less than 5% of the sample amount.

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-021797-NP-12

TOTAL Metals

Sample #...: A7B190119-002 Matrix.......: WATER
Sampled...: 02/17/97 00:00 Date Received..: 02/19/97

METER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Batch #...: 7051123						
:	ND	3.0	ug/L	SW846 6010A	02/20-02/21/97	C8748105
		Dilution Factor: 1				
·llium	ND	5.0	ug/L	SW846 6010A	02/20-02/21/97	C8748101
		Dilution Factor: 1				
nium	ND	5.0	ug/L	SW846 6010A	02/20-02/21/97	C8748102
		Dilution Factor: 1				
:mium	ND	10.0	ug/L	SW846 6010A	02/20-02/21/97	C8748103
		Dilution Factor: 1				
ganese	ND MBE	10.0	ug/L	SW846 6010A	02/20-02/21/97	C8748104
		Dilution Factor: 1				

E(S):

Th te is present in the associated method blank.

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-021897-NP-13

TOTAL Metals

Lot-Sample #...: A7B190119-003 Matrix.......: WATER
Date Sampled...: 02/18/97 00:00 Date Received..: 02/19/97

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 7051123						
Lead	ND	3.0	ug/L	SW846 6010A	02/20-02/21/97	C8749105
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	02/20-02/21/97	C8749101
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	02/20-02/21/97	C8749102
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	02/20-02/21/97	C8749103
		Dilution Factor: 1				
Manganese	4830 L,MBB	10.0	ug/L	SW846 6010A	02/20-02/21/97	C8749104
		Dilution Factor: 1				

NOTE(S):

L Serial dilution of a digestate in the analytical batch indicates that physical and chemical interferences are present.

MBB This analyte is present at a reportable level in the associated method blank but is less than 5% of the sample amount.

QUALITY CONTROL SECTION

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental and field QC samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

QUALITY CONTROL ELEMENTS OF SW-846 METHODS (cont.)

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If in the analyst's judgment, sample matrix effects are indicated and the LCS or LCSD is within acceptance criteria, no correction action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. The MS/DU is evaluated in the same manner as the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, all organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

i ıt Lot #...: A7B190119 **Matrix**.........: WATER

RAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
S Lot-Sample#: A7B200000-123 **Prep Batch #...:** 7051123					
ad	98	(80 - 120)	SW846 6010A	02/20/97	C87LQ10D
		Dilution Factor: 1			
dmium	99	(80 - 120)	SW846 6010A	02/20/97	C87LQ10F
		Dilution Factor: 1			
romium	96	(80 - 120)	SW846 6010A	02/20/97	C87LQ10G
		Dilution Factor: 1			
r_llium	94	(80 - 120)	SW846 6010A	02/20/97	C87LQ10L
		Dilution Factor: 1			
r anese	102	(80 - 120)	SW846 6010A	02/20/97	C87LQ109
		Dilution Factor: 1			

? (?):

... are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

TOTAL Metals

nt Lot #...: A7B190119 　　　　Matrix.........: WATER

METER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
ot-Sample #: A7B200000-123 Prep Batch #...: 7051123						
	ND	3.0	ug/L	SW846 6010A	02/20/97	C87LQ104
		Analysis Time..: 22:52				
·llium	ND	5.0	ug/L	SW846 6010A	02/20/97	C87LQ10J
		Analysis Time..: 22:52				
ɔium	ND	5.0	ug/L	SW846 6010A	02/20/97	C87LQ106
		Analysis Time..: 22:52				
ɔmium	ND	10.0	ug/L	SW846 6010A	02/20/97	C87LQ107
		Analysis Time..: 22:52				
ganese	14.0	10.0	ug/L	SW846 6010A	02/20/97	C87LQ101
		Analysis Time..: 22:52				

E(S):

lations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

: ent Lot #...: A7B190119 | Matrix.........: WATER

ate Sampled...: 02/05/97 00:00 Date Received..: 02/08/97

ARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
: Lot-Sample #: A7B190143-004 Prep Batch #...: 7051123							
..yllium	85	(80 - 120)			SW846 6010A	02/20-02/21/97	C87DQ112
	95	(80 - 120)	11	(0-20)	SW846 6010A	02/20-02/21/97	C87DQ113
		Dilution Factor: 1					
admium	91	(80 - 120)			SW846 6010A	02/20-02/21/97	C87DQ102
	100	(80 - 120)	9.8	(0-20)	SW846 6010A	02/20-02/21/97	C87DQ103
		Dilution Factor: 1					
:romium	87	(80 - 120)			SW846 6010A	02/20-02/21/97	C87DQ105
	96	(80 - 120)	10	(0-20)	SW846 6010A	02/20-02/21/97	C87DQ106
		Dilution Factor: 1					
--d	89	(80 - 120)			SW846 6010A	02/20-02/21/97	C87DQ10M
	98	(80 - 120)	10	(0-20)	SW846 6010A	02/20-02/21/97	C87DQ10N
		Dilution Factor: 1					
ganese	92	(80 - 120)			SW846 6010A	02/20-02/21/97	C87DQ10C
	103	(80 - 120)	11	(0-20)	SW846 6010A	02/20-02/21/97	C87DQ10D
		Dilution Factor: 1					

: E(S):

lculations are performed before rounding to avoid round-off errors in calculated results.

1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: J. NEIL PICKARD

PARAMETERS: Beryllium, Cadmium, Chromium, Lead, Manganese

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese				REMARKS
	2/17		GW-3482-021797-NP-11	water	1	X	X	X	X	X				
	↓		GW-3482-021797-NP-12	↓	↓	X	X	X	X	X				
	2/18		GW-3482-021897-NP-13	↓	↓	X	X	X	X	X				

[signature] 2/18/97

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	DATE / TIME
① [signature]	DATE: 2/18/97 TIME: 16:00	②	DATE: TIME:
②	DATE: TIME:	③	DATE: TIME:
③	DATE: TIME:	④	DATE: TIME:

METHOD OF SHIPMENT: FED EX

AIR BILL NUMBER: 320 2332 864

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: N. PICKARD

RECEIVED FOR LABORATORY BY: [signature]

DATE: 2-19-97 TIME: 11:40

00252

1007(FORMS) — DEC 8, 93 — REV.D — (AF-01)

ATTACHMENT B

Quanterra
Environmental Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental and field QC samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

Quanterra
Environmental
Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS (cont.)

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If in the analyst's judgment, sample matrix effects are indicated and the LCS or LCSD is within acceptance criteria, no correction action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. The MS/DU is evaluated in the same manner as the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, all organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria.

Quanterra
Environmental
Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

t Lot #...: A7B140132 Matrix.........: WATER

ETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
ot-Sample#: A7B170000-132 Prep Batch #...: 7048132					
ium	99	(80 - 120) Dilution Factor: 1	SW846 6010A	02/17/97	C862V10A
nese	106	(80 - 120) Dilution Factor: 1	SW846 6010A	02/17/97	C862V106
	100	(80 - 120) Dilution Factor: 1	SW846 6010A	02/17/97	C862V107
llium	95	(80 - 120) Dilution Factor: 1	SW846 6010A	02/17/97	C862V108
ium	102	(80 - 120) Dilution Factor: 1	SW846 6010A	02/17/97	C862V109

(S):

no' e performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

METHOD BLANK REPORT

TOTAL Metals

] ent Lot #...: A7B140132 Matrix.........: WATER

: AMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
B Lot-Sample #: A7B170000-132 Prep Batch #...: 7048132						
: d	ND	3.0	ug/L	SW846 6010A	02/17/97	C862V102
		Dilution Factor: 1				
є yllium	ND	5.0	ug/L	SW846 6010A	02/17/97	C862V103
		Dilution Factor: 1				
admium	ND	5.0	ug/L	SW846 6010A	02/17/97	C862V104
		Dilution Factor: 1				
hromium	ND	5.0	ug/L	SW846 6010A	02/17/97	C862V105
		Dilution Factor: 1				
anganese	ND	10.0	ug/L	SW846 6010A	02/17/97	C862V101
		Dilution Factor: 1				

OTE(S):

alculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

: Lot #...: A7B140132 Matrix.........: WATER
Sampled...: 02/08/97 15:45 Date Received..: 02/14/97

ETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
t-Sample #: A7B140132-001 Prep Batch #...: 7048132							
	98	(80 - 120)			SW846 6010A	02/17/97	C85G310F
	100	(80 - 120)	1.4	(0-20)	SW846 6010A	02/17/97	C85G310G
		Dilution Factor: 1					
lium	96	(80 - 120)			SW846 6010A	02/17/97	C85G3102
	98	(80 - 120)	1.7	(0-20)	SW846 6010A	02/17/97	C85G3103
		Dilution Factor: 1					
um	100	(80 - 120)			SW846 6010A	02/17/97	C85G3105
	102	(80 - 120)	1.3	(0-20)	SW846 6010A	02/17/97	C85G3106
		Dilution Factor: 1					
ium	99	(80 - 120)			SW846 6010A	02/17/97	C85G3108
	100	(80 - 120)	0.86	(0-20)	SW846 6010A	02/17/97	C85G3109
		Dilution Factor: 1					
anese	104	(80 - 120)			SW846 6010A	02/17/97	C85G310C
	105	(80 - 120)	0.98	(0-20)	SW846 6010A	02/17/97	C85G310D
		Dilution Factor: 1					

(S):

ions are performed before rounding to avoid round-off errors in calculated results.

CON G. OVE AS CIAT INC
1351 O. ook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN LF

SAMPLER'S SIGNATURE: [signature]   PRINTED NAME: J. NEIL PICKARD

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	PARAMETERS					REMARKS
	2/8/97	3:45	GW-3482-020897-NP-01 ms/msd	water	2	X	X	X	X	X	
	2/9/97	12:30	GW-3482-020997-NP-02	↓	1	X	X	X	X	X	
	2/9/97	6:15	GW-3482-020997-NP-03		1	X	X	X	X	X	
	2/9/97	6:15	GW-3482-020997-NP-04		1	X	X	X	X	X	
	2/10/97	11:15	GW-3482-021097-NP-05		1	X	X	X	X	X	
	2/10/97	4:00	GW-3482-021097-NP-06		1	X	X	X	X	X	
	2/11/97	1:30	GW-3482-021197-NP-07		1	X	X	X	X	X	
	2/12/97	10:00	GW-3482-021297-NP-08		1	X	X	X	X	X	
	2/12/97	2:15	GW-3482-021297-NP-09		1	X	X	X	X	X	
	2/12/97	3:50	GW-3482-021297-NP-10	↓	1	X	X	X	X	X	

[signature] 2/13/97

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: ① [signature]	DATE: 2/13/97 TIME: 11:00	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FEDEX PRIORITY   AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: NEIL PICKARD

RECEIVED FOR LABORATORY BY: [signature]

DATE: 2.14.97 TIME: 11:10A

№ 0876

1007(FORMS) — DEC 6, 93 — REV.D — (AF-01)

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

497-9396 Telephone
330 497-0772 Fax

Quanterra
Environmental
Services

Rec'd CRA

MAR 04 1997

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN

Lot #: A7B190119

Joanne Toth

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Kae E. Yoder

Kae E. Yoder
Project Manager

March 3, 1997

CASE NARRATIVE

The following report contains the analytical results for three water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Site, project number 3482. The samples were received February 19, 1997, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Toth and Neil Pickard on March 3, 1997. A summary of QC data for these analyses is included at the rear of the report.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

Supplemental QC Information

Metals

Manganese is present in the method blank associated with QC batch 7051123 at 14.0 ug/L. Because this analyte is present at a level that is less than 5% of the sample amount, corrective action is not required.

ANALYTICAL METHODS SUMMARY

A7B190119

PARAMETER	ANALYTICAL METHOD
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A7B190119

: :	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
3747	001	GW-3482-021797-NP-11	02/17/97	00:00
3748	002	GW-3482-021797-NP-12	02/17/97	00:00
3 :9	003	GW-3482-021897-NP-13	02/18/97	00:00

TE(S):

- nalytical results of the samples listed above are presented on the following pages.
- lculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- report must not be reproduced, except in full, without the written approval of the laboratory.
- lts for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, aint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-021797-NP-11

TOTAL Metals

-Sample #...: A7B190119-001 Matrix.......: WATER
e Sampled...: 02/17/97 00:00 Date Received..: 02/19/97

AMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
:p Batch #...: 7051123						
.d	ND	3.0	ug/L	SW846 6010A	02/20-02/21/97	C8747105
		Dilution Factor: 1				
:yllium	ND	5.0	ug/L	SW846 6010A	02/20-02/21/97	C8747101
		Dilution Factor: 1				
imium	ND	5.0	ug/L	SW846 6010A	02/20-02/21/97	C8747102
		Dilution Factor: 1				
:romium	ND	10.0	ug/L	SW846 6010A	02/20-02/21/97	C8747103
		Dilution Factor: 1				
nganese	4330 MBB	10.0	ug/L	SW846 6010A	02/20-02/21/97	C8747104
		Dilution Factor: 1				

TE'S):

B aryte is present at a reportable level in the associated method blank but is less than 5% of the sample amount.

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-021797-NP-12

TOTAL Metals

ot-Sample #...: A7B190119-002 Matrix.......: WATER
e Sampled...: 02/17/97 00:00 Date Received..: 02/19/97

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
rep Batch #...: 7051123						
ead	ND	3.0	ug/L	SW846 6010A	02/20-02/21/97	C8748105
		Dilution Factor: 1				
eryllium	ND	5.0	ug/L	SW846 6010A	02/20-02/21/97	C8748101
		Dilution Factor: 1				
admium	ND	5.0	ug/L	SW846 6010A	02/20-02/21/97	C8748102
		Dilution Factor: 1				
omium	ND	10.0	ug/L	SW846 6010A	02/20-02/21/97	C8748103
		Dilution Factor: 1				
ganese	ND MBE	10.0	ug/L	SW846 6010A	02/20-02/21/97	C8748104
		Dilution Factor: 1				

'S):

analyte is present in the associated method blank.

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-021897-NP-13

TOTAL Metals

·Sample #...: A7B190119-003 Matrix.......: WATER
: Sampled...: 02/18/97 00:00 Date Received..: 02/19/97

METER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Batch #...: 7051123						
i	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	02/20-02/21/97	C8749105
llium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	02/20-02/21/97	C8749101
nium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	02/20-02/21/97	C8749102
omium	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	02/20-02/21/97	C8749103
ganese	4830 L,MBB	10.0 Dilution Factor: 1	ug/L	SW846 6010A	02/20-02/21/97	C8749104

E(S):

erial dilution of a digestate in the analytical batch indicates that physical and chemical interferences are present.

T yte is present at a reportable level in the associated method blank but is less than 5% of the sample amount.

QUALITY CONTROL SECTION

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental and field QC samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

QUALITY CONTROL ELEMENTS OF SW-846 METHODS (cont.)

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If in the analyst's judgment, sample matrix effects are indicated and the LCS or LCSD is within acceptance criteria, no correction action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. The MS/DU is evaluated in the same manner as the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, all organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

t Lot #...: A7B190119 Matrix.........: WATER

ETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
ot-Sample#: A7B200000-123 Prep Batch #...: 7051123					
	98	(80 - 120)	SW846 6010A	02/20/97	C87LQ10D
		Dilution Factor: 1			
.um	99	(80 - 120)	SW846 6010A	02/20/97	C87LQ10F
		Dilution Factor: 1			
nium	96	(80 - 120)	SW846 6010A	02/20/97	C87LQ10G
		Dilution Factor: 1			
llium	94	(80 - 120)	SW846 6010A	02/20/97	C87LQ10L
		Dilution Factor: 1			
anese	102	(80 - 120)	SW846 6010A	02/20/97	C87LQ109
		Dilution Factor: 1			

:(S) :

u performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

TOTAL Metals

:lient Lot #...: A7B190119 Matrix.........: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
4 Lot-Sample #: A7B200000-123 Prep Batch #...: 7051123						
: ad	ND	3.0	ug/L	SW846 6010A	02/20/97	C87LQ104
		Analysis Time..: 22:52				
3 ryllium	ND	5.0	ug/L	SW846 6010A	02/20/97	C87LQ10J
		Analysis Time..: 22:52				
: dmium	ND	5.0	ug/L	SW846 6010A	02/20/97	C87LQ106
		Analysis Time..: 22:52				
:' romium	ND	10.0	ug/L	SW846 6010A	02/20/97	C87LQ107
		Analysis Time..: 22:52				
Manganese	14.0	10.0	ug/L	SW846 6010A	02/20/97	C87LQ101
		Analysis Time..: 22:52				

NOTE(S):

...tions are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

nt Lot #...: A7B190119 **Matrix.........:** WATER
: Sampled...: 02/05/97 00:00 **Date Received..:** 02/08/97

METER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	ME' OD	PREPARATION-ANALYSIS DATE	WORK CRDER #
ot-Sample #: A7B190143-004 **Prep Batch #...:** 7051123							
·llium	85	(80 - 120)			SW846 6010A	02/20-02/21/97	C87DQ112
	95	(80 - 120)	11	(0-20)	SW846 6010A	02/20-02/21/97	C87DQ113
		Dilution Factor: 1					
nium	91	(80 - 120)			SW846 6010A	02/20-02/21/97	C87DQ102
	100	(80 - 120)	9.8	(0-20)	SW846 6010A	02/20-02/21/97	C87DQ103
		Dilution Factor: 1					
mium	87	(80 - 120)			SW846 6010A	02/20-02/21/97	C87DQ105
	96	(80 - 120)	10	(0-20)	SW846 6010A	02/20-02/21/97	C87DQ106
		Dilution Factor: 1					
d	89	(80 - 120)			SW846 6010A	02/20-02/21/97	C87DQ10M
	98	(80 - 120)	10	(0-20)	SW846 6010A	02/20-02/21/97	C87DQ10N
		Dilution Factor: 1					
ganese	92	(80 - 120)			SW846 6010A	02/20-02/21/97	C87DQ10C
	103	(80 - 120)	11	(0-20)	SW846 6010A	02/20-02/21/97	C87DQ10D
		Dilution Factor: 1					

E(S):

lations are performed before rounding to avoid round-off errors in calculated results.

JONES ... A-F...ERS ... SSC... TES, ...
1351 Oak ... ok Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

... AN... RA ... Vo ... NT ... C... 0

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: J. NEIL PICKARD

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese				REMARKS
	2/17		GW-3482-021797-NP-11	water	1	X	X	X	X	X				
	↓		GW-3482-021797-NP-12	↓	↓	X	X	X	X	X				
	2/18		GW-3482-021897-NP-13	↓	↓	X	X	X	X	X				

[signature] 2/18/97

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: ① [signature]	DATE: 2/18/97 TIME: 16:00	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED EX

AIR BILL NUMBER: 320 2332 864

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: N. PICKARD

RECEIVED FOR LABORATORY BY: Jami Stephens

DATE: 2-19-97 TIME: 11:40

00252

1007(FORMS) — DEC 8 83 — REVD — (AF-01)

ATTACHMENT B

MEMO

TO: Joanne Toth

REFERENCE NO. 3482

FROM: Phil Demsey/ev/27 PD

DATE: March 13, 1997

RE: Data Quality Assurance Evaluation
Quarterly Groundwater Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Thirteen groundwater samples, including two quality assurance samples, were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia on February 8 to February 12, 1997 and on February 17 and February 18, 1997. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead.

This memorandum presents an analytical assessment and validation of sample results received in two reports (Nos. A7B140132 and A7B190119) from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Final Update IIB, January 1995. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and control samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection dates noted in the chain-of-custody documents and the sample preparation/analysis dates reported by Quanterra. The sample holding time criterion for metals, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications are not necessary on this basis.

2.2 METHOD BLANK ANALYSIS

Method blank samples are used to determine the effects on analytical results due to contamination from laboratory procedures. Two method blanks were analyzed with the investigative samples. With the exception of manganese in one method blank, target parameters were not detected in the blanks analyzed in conjunction with the analyzed samples. Manganese was detected at a level of 14.0 µg/L in one method blank. The manganese results in associated investigative samples either exceeded five times the detected level of manganese in this blank or were non-detect for manganese. Therefore, data qualifications are not necessary on the basis of method blank analyses.

2.3 LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

Laboratory control samples are analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. All LCS recoveries fell within the laboratory-established control limits of 80 to 120 percent. Data qualifications are not required on this basis.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSIS

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology. One MS/MSD was performed on a sample collected from the Site; while the second MS/MSD sample was from a source other than the Site.

Reported MS/MSD recoveries fell within laboratory-established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20, indicating acceptable method precision. Data qualifications are not required on this basis.

2.5 RINSE BLANK ANALYSIS

Rinse blank analyses are used to determine the efficiency of field decontamination procedures conducted during this sampling event. One rinse blank sample (GW-3482-021297-NP-08) was collected and submitted for analysis along with the investigative samples.

No target compounds were detected in the rinse blank, indicating that effective field decontamination procedures were performed during sampling. Therefore, no data qualifications are necessary on this basis.

2.6 FIELD DUPLICATE ANALYSIS

Field duplicate samples are used as an indication of field and analytical reproducibility. Field duplicate results are compared and assessed based on the RPD calculated for each pair of duplicate results.

One set of duplicate samples was collected from monitoring well OW-5. Both samples contained non-detectable levels of target analytes. Therefore, acceptable reproducibility was demonstrated. No data qualifications are required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated completeness and are acceptable for use without qualification, based on the QA/QC criteria.

Quanterra Incorporated
4101 Shuffel Drive NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

Quanterra
Environmental Services

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNIC. LANDFILL

Lot #: A7I120111

Joanne Toth

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Kae E. Yoder

Kae E. Yoder
Project Manager

September 30, 1997

CASE NARRATIVE

The following report contains the analytical results for twelve water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received September 12, 1997, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the analytical methods summary page in accordance with the methods indicated. Results were provided by facsimile transmission to Anita Mirabelli on September 24, 1997, and to Joanne Toth on September 25, 1997. A summary of QC data for these analyses is included at the rear of the report.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the laboratory protocol.

Supplemental QC Information

ıe chloride matrix spike/matrix spike duplicates (MS/MSDs) performed on samples GW-3482-090997-JOS-01 and GW-3482-091097-JOS-12 (MS/MSD) exhibited percent recoveries outside the acceptance limits. The acceptable laboratory control sample analysis data indicated that the analytical systems were operating within control and this condition is most likely due to matrix interference.

ANALYTICAL METHODS SUMMARY

A7I120111

PARAMETER	ANALYTICAL METHOD
Chloride	SW846 9251
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Sulfate	SW846 9038
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A7I120111

SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
001	GW-3482-090997-JOS-01	09/09/97	14:45
002	GW-3482-090997-JOS-02	09/09/97	11:20
003	GW-3482-090997-JOS-03	09/09/97	11:30
004	GW-3482-090997-JOS-04	09/09/97	12:00
005	GW-3482-090997-DJB-05	09/09/97	14:00
006	GW-3482-090997-JOS-06	09/09/97	16:00
007	GW-3482-090997-DJB-007	09/09/97	17:00
008	GW-3482-090997-JOS-08	09/09/97	18:00
009	GW-3482-091097-JOS-09	09/10/97	09:00
010	GW-3482-091097-DJB-10	09/10/97	12:15
011	GW-3482-091097-DJB-011	09/10/97	13:15
012	GW-3482-091097-JOS-12 (MS/MSD)	09/10/97	17:00

(S):

alytical results of the samples listed above are presented on the following pages.

culations are performed before rounding to avoid round-off errors in calculated results.

noted as "ND" were not detected at or above the stated limit.

port must not be reproduced, except in full, without the written approval of the laboratory.

for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor,

lter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-01

TOTAL Metals

: -Sample #...: A7I120111-001 Matrix.......: WATER
ate Sampled...: 09/09/97 14:45 Date Received..: 09/12/97

AMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
:) Batch #...: 7258135						
llium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRFX101
		Dilution Factor: 1				
l	**17.1**	**3.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRFX108**
		Dilution Factor: 1				
ium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRFX102
		Dilution Factor: 1				
mium	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRFX103
		Dilution Factor: 1				
anese	**1220**	**10.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRFX104**
		Dilution Factor: 1				
dium	**11200**	**5000**	**ug/L**	**SW846 6010A**	**09/15-09/17/97**	**CCRFX105**
		Dilution Factor: 1				
a..um	ND	50.0	ug/L	SW846 6010A	09/15-09/16/97	CCRFX106
		Dilution Factor: 1				
c	**76.7 L**	**20.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRFX107**
		Dilution Factor: 1				

(S):

rial dilution or a digestate in the analytical batch indicates that physical and chemical interferences are present.

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-01

General Chemistry

mple #...: A7I120111-001 Work Order #...: CCRFX Matrix........: WATER
ampled...: 09/09/97 14:45 Date Received..: 09/12/97

TER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
de - Automated	13	1	mg/L	SW846 9251	09/23/97	7266217
	Dilution Factor: 1					
e	6	5	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 1					

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-02

TOTAL Metals

t Sample #...: A7I120111-002 Matrix.......: WATER
te Sampled...: 09/09/97 11:20 Date Received..: 09/12/97

AMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Batch #...: 7258135						
.lium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGK101
	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGK108
.um	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGK102
ium	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGK103
nese	15.1	10.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGK104
ium	ND	5000 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/17/97	CCRGK105
adium	ND	50.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGK106
c	112	20.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGK107

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-02

General Chemistry

mple #...: A7I120111-002 Work Order #...: CCRGK Matrix.........: WATER
ampled...: 09/09/97 11:20 Date Received..: 09/12/97

TER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
de - Automated	3	1	mg/L	SW846 9251	09/23/97	7266217
	Dilution Factor: 1					
e	ND	5	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 1					

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-03

TOTAL Metals

:-Sample #...: A7I120111-003 Matrix.......: WATER
ate Sampled...: 09/09/97 11:30 Date Received..: 09/12/97

AMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
p Batch #...: 7258135						
yllium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGL101
		Dilution Factor: 1				
d	ND	3.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGL108
		Dilution Factor: 1				
nium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGL102
		Dilution Factor: 1				
omium	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGL103
		Dilution Factor: 1				
nganese	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGL104
		Dilution Factor: 1				
dium	ND	5000	ug/L	SW846 6010A	09/15-09/17/97	CCRGL105
		Dilution Factor: 1				
nadium	ND	50.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGL106
		Dilution Factor: 1				
nc	24.3	20.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGL107
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-03

General Chemistry

mple #...: A7I120111-003 Work Order #...: CCRGL Matrix.........: WATER
ampled...: 09/09/97 11:30 Date Received..: 09/12/97

TER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
de - Automated	2	1	mg/L	SW846 9251	09/23/97	7266217
	Dilution Factor: 1					
:e	18	5	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 1					

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-04

TOTAL Metals

t Sample #...: A7I120111-004 Matrix.......: WATER
te Sampled...: 09/09/97 12:00 Date Received..: 09/12/97

METER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Batch #...: 7258135						
llium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGM101
		Dilution Factor: 1				
	8.8	3.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGM108
		Dilution Factor: 1				
um	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGM102
		Dilution Factor: 1				
mium	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGM103
		Dilution Factor: 1				
ganese	1260	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGM104
		Dilution Factor: 1				
ium	11500	5000	ug/L	SW846 6010A	09/15-09/17/97	CCRGM105
		Dilution Factor: 1				
adium	ND	50.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGM106
		Dilution Factor: 1				
	61.6	20.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGM107
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC., LTD.

Client Sample ID: GW-3482-090997-JOS-04

General Chemistry

ample #...: A7I120111-004   Work Order #...: CCRGM   Matrix.........: WATER
Sampled...: 09/09/97 12:00   Date Received..: 09/12/97

ETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
ide - Automated	13	1	mg/L	SW846 9251	09/23/97	7266217
	Dilution Factor: 1					
.te	8	5	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 1					

CONESTOGA-ROVERS & ASSOC., LTD.

Client Sample ID: GW-3482-090997-DJB-05

TOTAL Metals

: -Sample #...: A7I120111-005 Matrix.......: WATER
ate Sampled...: 09/09/97 14:00 Date Received..: 09/12/97

..AMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
:) Batch #...: 7258135						
rllium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGN101
		Dilution Factor: 1				
. i	ND	3.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGN108
		Dilution Factor: 1				
iium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGN102
		Dilution Factor: 1				
: mium	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGN103
		Dilution Factor: 1				
nganese	**76.6**	**10.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGN104**
		Dilution Factor: 1				
dium	ND	5000	ug/L	SW846 6010A	09/15-09/17/97	CCRGN105
		Dilution Factor: 1				
na..um	ND	50.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGN106
		Dilution Factor: 1				
nc	**51.0**	**20.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGN107**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-DJB-05

General Chemistry

ple #...: A7I120111-005 Work Order #...: CCRGN Matrix.........: WATER
mpled...: 09/09/97 14:00 Date Received..: 09/12/97

ER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
e - Automated	1	1	mg/L	SW846 9251	09/23/97	7266217
	Dilution Factor: 1					
	ND	5	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 1					

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-06

TOTAL Metals

Sample #...: A7I120111-006 Matrix.......: WATER
te Sampled...: 09/09/97 16:00 Date Received..: 09/12/97

METER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Batch #...: 7258135						
·ilium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGP101
		Dilution Factor: 1				
[illegible]	ND	3.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGP108
		Dilution Factor: 1				
ium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGP102
		Dilution Factor: 1				
romium	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGP103
		Dilution Factor: 1				
nganese	3070	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGP104
		Dilution Factor: 1				
dium	15500	5000	ug/L	SW846 6010A	09/15-09/17/97	CCRGP105
		Dilution Factor: 1				
na..um	ND	50.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGP106
		Dilution Factor: 1				
[illegible]	57.8	20.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGP107
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-06

General Chemistry

t-Sample #...: A7I120111-006 Work Order #...: CCRGP Matrix.........: WATER
te Sampled...: 09/09/97 16:00 Date Received..: 09/12/97

RAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
loride - Automated	16 Dilution Factor: 1	1	mg/L	SW846 9251	09/23/97	7266217
lfate	ND Dilution Factor: 1	5	mg/L	SW846 9038	09/24/97	7267151

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-DJB-007

TOTAL Metals

ot-Sample #...: A7I120111-007 Matrix.......: WATER
ate Sampled...: 09/09/97 17:00 Date Received..: 09/12/97

ARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
rep Batch #...: 7258135						
eryllium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGQ101
		Dilution Factor: 1				
ead	ND	3.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGQ108
		Dilution Factor: 1				
admium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGQ102
		Dilution Factor: 1				
hromium	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGQ103
		Dilution Factor: 1				
Manganese	**2110**	**10.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGQ104**
		Dilution Factor: 1				
Sodium	**222000**	**5000**	**ug/L**	**SW846 6010A**	**09/15-09/17/97**	**CCRGQ105**
		Dilution Factor: 1				
adium	ND	50.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGQ106
		Dilution Factor: 1				
inc	**37.6**	**20.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGQ107**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-DJB-007

General Chemistry

ot-Sample #...: A7I120111-007 **Work Order #...:** CCRGQ **Matrix.........:** WATER
ate Sampled...: 09/09/97 17:00 **Date Received..:** 09/12/97

ARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
iloride - Automated	11	1	mg/L	SW846 9251	09/23/97	7266217
	Dilution Factor: 1					
ilfate	170	50	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 10					

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-08

TOTAL Metals

Lot-Sample #...: A7I120111-008 **Matrix.......:** WATER
Date Sampled...: 09/09/97 18:00 **Date Received..:** 09/12/97

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 7258135						
Beryllium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGR101
		Dilution Factor: 1				
Lead	ND	3.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGR108
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGR102
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGR103
		Dilution Factor: 1				
Manganese	**2080**	**10.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGR104**
		Dilution Factor: 1				
Sodium	**8130**	**5000**	**ug/L**	**SW846 6010A**	**09/15-09/17/97**	**CCRGR105**
		Dilution Factor: 1				
Vanadium	ND	50.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGR106
		Dilution Factor: 1				
Zinc	**198**	**20.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGR107**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-090997-JOS-08

General Chemistry

t-Sample #...: A7I120111-008   **Work Order #...:** CCRGR   **Matrix.........:** WATER
te Sampled...: 09/09/97 18:00   **Date Received..:** 09/12/97

RAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
loride - Automated	17	1	mg/L	SW846 9251	09/23/97	7266217
	Dilution Factor: 1					
lfate	30	10	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 2					

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3462-091097-JOS-09

TOTAL Metals

Lot-Sample #...: A7I120111-009 Matrix.......: WATER
Date Sampled...: 09/10/97 09:00 Date Received..: 09/12/97

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 7258135						
Beryllium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGT101
Lead	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGT108
Cadmium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGT102
Chromium	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGT103
Manganese	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGT104
Sodium	**5030**	**5000** Dilution Factor: 1	**ug/L**	**SW846 6010A**	**09/15-09/17/97**	**CCRGT105**
.nadium	ND	50.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCRGT106
Zinc	**28.2**	**20.0** Dilution Factor: 1	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGT107**

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-091097-JOS-09

General Chemistry

t-Sample #...: A7I120111-009 Work Order #...: CCRGT Matrix.........: WATER
te Sampled...: 09/10/97 09:00 Date Received..: 09/12/97

RAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
loride - Automated	4	1	mg/L	SW846 9251	09/23/97	7266217
	Dilution Factor: 1					
lfate	8	5	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 1					

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-091097-DJB-10

TOTAL Metals

ot-Sample #...: A7I120111-010 Matrix.......: WATER
Date Sampled...: 09/10/97 12:15 Date Received..: 09/12/97

ARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
rep Batch #...: 7258135						
eryllium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGV101
		Dilution Factor: 1				
ead	ND	3.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGV108
		Dilution Factor: 1				
admium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGV102
		Dilution Factor: 1				
hromium	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGV103
		Dilution Factor: 1				
Manganese	**231**	**10.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGV104**
		Dilution Factor: 1				
Sodium	ND	5000	ug/L	SW846 6010A	09/15-09/17/97	CCRGV105
		Dilution Factor: 1				
V. adium	ND	50.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGV106
		Dilution Factor: 1				
inc	**76.0**	**20.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGV107**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC., LTD.

Client Sample ID: GW-3482-091097-DJB-10

General Chemistry

:-Sample #...: A7I120111-010   Work Order #...: CCRGV   Matrix.........: WATER
:e Sampled...: 09/10/97 12:15   Date Received..: 09/12/97

?AMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
loride - Automated	2	1	mg/L	SW846 9251	09/23/97	7266217
	Dilution Factor: 1					
lfate	7	5	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 1					

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-091097-DJB-011

TOTAL Metals

Lot-Sample #...: A7I120111-011 **Matrix.......:** WATER
Date Sampled...: 09/10/97 13:15 **Date Received..:** 09/12/97

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 7258135						
Beryllium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGW101
		Dilution Factor: 1				
Lead	ND	3.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGW108
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGW102
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGW103
		Dilution Factor: 1				
Manganese	**4640**	**10.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGW104**
		Dilution Factor: 1				
Sodium	**10300**	**5000**	**ug/L**	**SW846 6010A**	**09/15-09/17/97**	**CCRGW105**
		Dilution Factor: 1				
Vanadium	ND	50.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGW106
		Dilution Factor: 1				
Zinc	**79.5**	**20.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGW107**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-091097-DJB-011

General Chemistry

t-Sample #...: A7I120111-011 **Work Order #...:** CCRGW **Matrix.........:** WATER
te Sampled...: 09/10/97 13:15 **Date Received..:** 09/12/97

RAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
loride - Automated	6	1	mg/L	SW846 9251	09/23/97	7266217
	Dilution Factor: 1					
lfate	24	5	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 1					

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-091097-JOS-12 (MS/MSD)

TOTAL Metals

Lot-Sample #...: A7I120111-012 Matrix.......: WATER
Date Sampled...: 09/10/97 17:00 Date Received..: 09/12/97

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 7258135						
Beryllium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGX101
		Dilution Factor: 1				
Lead	ND	3.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGX10P
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGX104
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGX107
		Dilution Factor: 1				
Manganese	**202**	**10.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGX10A**
		Dilution Factor: 1				
Sodium	ND	5000	ug/L	SW846 6010A	09/15-09/17/97	CCRGX10E
		Dilution Factor: 1				
Vanadium	ND	50.0	ug/L	SW846 6010A	09/15-09/16/97	CCRGX10H
		Dilution Factor: 1				
Zinc	**66.7**	**20.0**	**ug/L**	**SW846 6010A**	**09/15-09/16/97**	**CCRGX10L**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC., LTD.

Client Sample ID: GW-3482-091097-JOS-12 (MS/MSD)

General Chemistry

Lot-Sample #...: A7I120111-012 **Work Order #...:** CCRGX **Matrix.........:** WATER
Date Sampled...: 09/10/97 17:00 **Date Received..:** 09/12/97

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Chloride - Automated	2	1	mg/L	SW846 9251	09/23/97	7266228
	Dilution Factor: 1					
Sulfate	9	5	mg/L	SW846 9038	09/24/97	7267151
	Dilution Factor: 1					

QUALITY CONTROL SECTION

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra® Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX-SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

QUALITY CONTROL ELEMENTS OF SW-846 METHODS (cont.)

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If, in the analyst's judgment, sample matrix effects are indicated, no correction action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

For the GC/MS BNA methods, the surrogate criteria is that two of the three surrogates must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide/PCB, PAH, TPH, and Herbicide methods, the surrogate criteria is that one of two surrogate compounds meet acceptance criteria.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A7I120111 **Matrix.........:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: A7I150000-135 **Prep Batch #...:** 7258135					
Sodium	97	(88 - 107)	SW846 6010A	09/15-09/17/97	CCTTH10A
		Dilution Factor: 1			
Vanadium	101	(86 - 111)	SW846 6010A	09/15-09/16/97	CCTTH10C
		Dilution Factor: 1			
Zinc	110	(83 - 120)	SW846 6010A	09/15-09/16/97	CCTTH10D
		Dilution Factor: 1			
Lead	100	(88 - 113)	SW846 6010A	09/15-09/16/97	CCTTH10E
		Dilution Factor: 1			
Beryllium	102	(85 - 110)	SW846 6010A	09/15-09/16/97	CCTTH10F
		Dilution Factor: 1			
Cadmium	105	(89 - 115)	SW846 6010A	09/15-09/16/97	CCTTH10G
		Dilution Factor: 1			
Chromium	110	(86 - 112)	SW846 6010A	09/15-09/16/97	CCTTH10H
		Dilution Factor: 1			
Manganese	100	(88 - 117)	SW846 6010A	09/15-09/16/97	CCTTH109
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: A7I120111 **Matrix..........:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Chloride - Automated		Work Order #: CD2E0102	LCS Lot-Sample#: A7I230000-217		
	97	(90 - 110)	SW846 9251	09/23/97	7266217
		Dilution Factor: 1			
Chloride - Automated		Work Order #: CD2ER102	LCS Lot-Sample#: A7I230000-228		
	96	(90 - 110)	SW846 9251	09/23/97	7266228
		Dilution Factor: 1			
Sulfate		Work Order #: CD2T7102	LCS Lot-Sample#: A7I240000-151		
	101	(90 - 110)	SW846 9038	09/24/97	7267151
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: A7I120111 Matrix.........: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: A7I150000-135 **Prep Batch #...:** 7258135						
Beryllium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCTTH106
Lead	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCTTH105
Cadmium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCTTH107
Chromium	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCTTH108
Manganese	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCTTH101
Sodium	ND	5000 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/17/97	CCTTH102
Vanadium	ND	50.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCTTH103
Zinc	ND	20.0 Dilution Factor: 1	ug/L	SW846 6010A	09/15-09/16/97	CCTTH104

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

ient Lot #...: A7I120111 | Matrix.........: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Chloride - Automated		Work Order #: CD2E0101		MB Lot-Sample #:	A7I230000-217	
	ND	1	mg/L	SW846 9251	09/23/97	7266217
		Dilution Factor: 1				
Chloride - Automated		Work Order #: CD2ER101		MB Lot-Sample #:	A7I230000-228	
	ND	1	mg/L	SW846 9251	09/23/97	7266228
		Dilution Factor: 1				
Sulfate		Work Order #: CD2T7101		MB Lot-Sample #:	A7I240000-151	
	ND	5	mg/L	SW846 9038	09/24/97	7267151
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A7I120111 Matrix.........: WATER
Date Sampled...: 09/10/97 17:00 Date Received..: 09/12/97

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: A7I120111-012 Prep Batch #...: 7258135							
Beryllium	99	(80 - 120)			SW846 6010A	09/15-09/16/97	CCRGX102
	100	(80 - 120)	1.5	(0-20)	SW846 6010A	09/15-09/16/97	CCRGX103
		Dilution Factor: 1					
Lead	97	(80 - 120)			SW846 6010A	09/15-09/16/97	CCRGX10Q
	98	(80 - 120)	1.4	(0-20)	SW846 6010A	09/15-09/16/97	CCRGX10R
		Dilution Factor: 1					
Cadmium	102	(80 - 120)			SW846 6010A	09/15-09/16/97	CCRGX105
	103	(80 - 120)	0.98	(0-20)	SW846 6010A	09/15-09/16/97	CCRGX106
		Dilution Factor: 1					
Chromium	98	(80 - 120)			SW846 6010A	09/15-09/16/97	CCRGX108
	100	(80 - 120)	1.4	(0-20)	SW846 6010A	09/15-09/16/97	CCRGX109
		Dilution Factor: 1					
Manganese	95	(80 - 120)			SW846 6010A	09/15-09/16/97	CCRGX10C
	98	(80 - 120)	1.5	(0-20)	SW846 6010A	09/15-09/16/97	CCRGX10D
		Dilution Factor: 1					
Sodium	92	(80 - 120)			SW846 6010A	09/15-09/17/97	CCRGX10F
	92	(80 - 120)	0.38	(0-20)	SW846 6010A	09/15-09/17/97	CCRGX10G
		Dilution Factor: 1					
Vanadium	98	(80 - 120)			SW846 6010A	09/15-09/16/97	CCRGX10J
	99	(80 - 120)	1.8	(0-20)	SW846 6010A	09/15-09/16/97	CCRGX10K
		Dilution Factor: 1					
Zinc	101	(80 - 120)			SW846 6010A	09/15-09/16/97	CCRGX10M
	107	(80 - 120)	5.3	(0-20)	SW846 6010A	09/15-09/16/97	CCRGX10N
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

General Chemistry

.ent Lot #...: A7I120111 **Matrix.........:** WATER
)ate Sampled...: 09/09/97 14:45 **Date Received..:** 09/12/97

'ARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
.hloride - Automated		WO#: CCRFX10C-MS/CCRFX10D-MSD				MS Lot-Sample #: A7I120111-001	
	91	(90 - 110)			SW846 9251	09/23/97	7266217
	89 N	(90 - 110)	1.3	(0-20)	SW846 9251	09/23/97	7266217
		Dilution Factor: 1					
'hloride - Automated		WO#: CCRGX10X-MS/CCRGX110-MSD				MS Lot-Sample #: A7I120111-012	
	91	(90 - 110)			SW846 9251	09/23/97	7266228
	89 N	(90 - 110)	2.2	(0-20)	SW846 9251	09/23/97	7266228
		Dilution Factor: 1					
.ulfate		WO#: CCRGX10U-MS/CCRGX10V-MSD				MS Lot-Sample #: A7I120111-012	
	107	(90 - 110)			SW846 9038	09/24/97	7267151
	106	(90 - 110)	0.83	(0-20)	SW846 9038	09/24/97	7267151
		Dilution Factor: 1					

"OTE(S):

'alculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

CF
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

2 COOLERS

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUNIC. LANDFILL

SAMPLER'S SIGNATURE: [signature]

PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	Lead	Chloride	Sulfate	Sodium	Vanadium	Zinc	REMARKS
	9/9/97	1445	GW-3482-090997-JOS-01	GW	2	X	X	X	X	X	X	X	X	X	X	
		1120	GW-3482-090997-JOS-02		2											
		1130	GW-3482-090997-JOS-03		2											
		1200	GW-3482-090997-JOS-04		2											
		1400	GW-3482-090997-DTB-05		2											
		1600	GW-3482-090997-JOS-06		2											
		1700	GW-3482-090997-DTB-007		2											
		1800	GW-3482-090997-JOS-08		2											
	9/10/97	0900	GW-3482-091097-JOS-09		2											
		1215	GW-3482-091097-DTB-10		2											
		1315	GW-3482-091097-DTB-011		2											
		1700	GW-3482-091097-JOS-12 MS/MSD		4											

TOTAL NUMBER OF CONTAINERS: 26

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
① [signature]	DATE: 9-11-97 TIME:	②	DATE: TIME:
②	DATE: TIME:	③	DATE: TIME:
③	DATE: TIME:	④	DATE: TIME:

METHOD OF SHIPMENT: FED EX O/N

AIR BILL NUMBER: 3023653644 / 3028691443

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: J. SCHWALLER / SCOTT KENT
D. BEYTOWSKI

RECEIVED FOR LABORATORY BY: [signature]
DATE: 970912 TIME: 1100A

№ 1032

MEMO

TO: Joanne Toth REFERENCE NO. 3482

FROM: Anita Mirabelli/cm/28 DATE: October 1, 1997

RE: Data Quality Assurance Evaluation
Quarterly Groundwater and Surface Water Sampling
Cedartown Municpal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Twelve groundwater samples were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia on September 9 and 10, 1997. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese, lead, vanadium, zinc, chloride, sulfate, and sodium.

This memo presents an analytical assessment and validation of results received in report No. A7I120111 obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Final Update IIB, January 1995. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection dates noted in the chain-of-custody document and the sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date for the requested metals: beryllium, cadmium, chromium, manganese, lead, vanadium, and zinc. Chloride and sulfate require a holding time of 28 days.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications are not necessary on this basis.

2.2 METHOD BLANK ANALYSIS

Method blank samples are used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in the blanks analyzed in conjunction with the analyzed samples. Data qualifications are not required on the basis of method blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples are analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. All LCS recoveries fell within the laboratory-established control limits. Data qualifications are not required on this basis.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSIS

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries fell within laboratory-established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20, indicating acceptable method precision. Data qualifications are not required on this basis.

2.5 RINSE BLANK ANALYSIS

Rinse blank analyses are used to determine the efficiency of field decontamination procedures conducted during this sampling event. One rinse blank sample (GW-3482-102496-JOS-08) was collected and submitted for the analyses.

No target compounds were detected in the rinse blank, indicating that effective field decontamination procedures were performed during sampling. Therefore, no data qualifications are necessary on this basis.

2.6 FIELD DUPLICATE ANALYSIS

Field duplicate samples are used as an indication of field and analytical reproducibility. Field duplicate results are compared and assessed based on the RPD calculated for each pair of duplicate results. The RPD must not exceed 30% for water matrix samples.

The pair of samples collected as field duplicates did not contain any detectable levels of target analytes; thus, their usefulness in determining precision cannot be assessed.

RPD calculated for each pair of duplicate results. The RPD must not exceed 30% for water matrix samples.

RPD values did not exceed 30% for each pair of duplicate results, with the exception of the RPD for lead (64%). Consequently, the detected results for lead in samples GW-3482-090997-JOS-01 and GW-3482-090997-JOS-04 are qualified as estimated (J). Required qualifications are listed in Table 1. No further qualifications are required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated acceptable accuracy and precision with respect to laboratory QC and may be used noting the qualifications arising from rinse blank and field duplicate analytes.